

Species
of
European and Northamerican
Bryineæ (Mosses)

synoptically described
by
N. Conr. Kindberg.

Part 1.

Pleurocarpous

Linköping,
Linköpings Litografiska Aktiebolag
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Preface.

Since the publication of Schimpers *Synopsis muscorum europæorum* (1876) and *Manual of the mosses of N. America* by Lesquereux and James (1884), the bryology is enriched by many new species. Also several very important bryological manuals, viz. by Boulay, Braithwaite, Husnot and Limpricht, have contributed to a more complete knowledge of the mosses.

The present treatise is an essay to revise and compare all hitherto known species and subspecies of Bryineæ, found in Europe and N. America. Excluded species are regarded as varieties or not sufficiently known.

I believe that the greatest importance is to attach to the natural affinity of such species as could be joined to common types (subgenera or groups). Affinity is not to be defined through a few artificial characters, stated «a priori». It needs therefore to select characters, peculiar and constant to each genus. Some characters are in some genera variable, but in others constant.

I have therefore not described selected specimens in all their parts but generally omitted such characters, as evidently are too variable. When some species are critical or hitherto not well-known. I have tried to propose all their necessary distinctive characters.

To facilitate the determination of sterile specimens, so often occurring, I have accurately described the areolation of the leaves and the common habit of the vegetals.

My descriptions are not transcribed from other authors but based on my own microscopical researches and studies in nature. I have therefore in Europe visited northern and southern districts and their different regions up to the glaciers and the perennial snow, also augmented my collections through contributions by many correspondents. The geographic distribution and the stations of N. American mosses are accurately observed principally by Prof. J. Macoun, Dr J. Roell and the Rev'd A. C. Waghorne, also (in Greenland) by Prof. S. Berggren.

In some few cases, when I not have had occasion to examine specimens of a very rare species, I must cite the descriptions of their authors or describe the species following good drawings, viz. *Icones muscorum* by Sullivant.

About 1600 species and 340 subspecies are described in my manuscript.

Common to Europe and N. America about	620 species.
Peculiar to N. America	635 »
Peculiar to Europe	345 »

1600 species.

In America are found about 1255 species, in Europe 965.

Linköping, Sweden dec. 1896.

The author.

As the continuation of this treatise, ready as manuscript, depends upon a sufficient number of subscribers (at least 50), the honored subscribers are requested to inform my publishers of their wishes, namely

Messrs P. M. Sahlström & C:o,
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Prize: 8 swedish crowns or »kronor» (= 9 shillings, 9 reichsmark, 11 francs) for the first part, *Pleurocarpous*; for the whole work 20 swed. crowns.

The subscribers shall obtain also my »Genera of european and northamerican *Bryinæ*, synoptically disposed».

The whole edition comprises only 200 copies. All can be printed before the fine of next year.



Abbreviations: *us.* usually; *gen.* generally; *princ.* principally; *r.* rarely; *Can.* Canada; *Eur.* Europe.

Fam. 1. **Cryphæaceæ.**

1. **Hedwigia** Ehrhart.

I. **Eu-Hedwigia.** Capsule immersed. Leaves us. denticulate at acumen. Stem r. flagelliferous. Tufts us. glaucous green.

II. **Braunia.** Capsule exserted. Leaves entire. Stem often flagelliferous. Tufts brown. Perichetial leaves not ciliate.

I. **Eu-Hedwigia.**

1. **H. albicans** Weber. — Fontinalis Web.; Hedwigia Lindberg.

Leaves broadly ovate-lanceolate or ovate-oblong, distinctly papillose, hyaline at the denticulate, us. prolonged acumen, recurved below; upper cells us. suboblong, sinuous at the walls. Perichetial leaves long-ciliate. Capsule piriform, wholly immersed. Stem not flagelliferous. — On stone, common (r. in northern alps). *Eur.**) Sweden, Norway, Germany, Switzerland! *Amer.* Canada: Macoun. »U. S.»: Lesq. et Jam. man.

* **H. subnuda** Kindberg catal. Canad. musci.

Leaves green, broad-ovate, indistinctly hyaline at the short and nearly entire acumen, recurved nearly all around; upper cells subquadrate. — Rocks r. *Amer.* Canada: Macoun.

2. **H. imberbis** Esenbeck et Hornschuch. — Schistidium Es. et Hsch.; Hedwigia Spruce.

Leaves subovate, faintly papillose, entire, not hyaline, recurved; upper cells suboblong, sinuous. Perichetial leaves not ciliate. Capsule round-oval, subemergent. Stem often flagelliferous; leaves of the flagellæ hyaline at apex. — Rocks r.; *Eur.* France!

II. **Braunia** Schimper.

3. **H. alopecura** Bridel. — Leucodon Brid.; Hedwigia Kindb.

Leaves ovate, faintly papillose, not hyaline, striate; cells less distinctly sinuous, the upper quadrate, the inner basal rectangular. Capsule oblong without neck; pedicel short. — Stones r.; *Eur.* Austria: Venturi.

4. **H. californica** Lesq. — *Braunia* Lesq., Sull. icon. m., Hedwigia Kindb.

*) The mark! indicates, that the author is the collector; the cited collectors have contributed to my collections.

Leaves distinctly papillose, from subovate base tapering to the hyaline and often long acumen, not striate; inner cells irregular, oval or angulate, sometimes sinuous; inner basal cells subrectangular. Capsule piriform, short-necked; pedicel long. — Rocks r. *Amer.* Pacific district. Canada: Macoun. U. S.: Henderson, com. Cardot.

2. *Leucodon* Schwægrichen.

A. Pedicel of the capsule long-exserted. Leaves gen. entire and not distinctly decurrent.

1. *L. sciuiroides* L. — Hypnum L.; *Leucodon* Schwægr.

Leaves ovate-oblong or broadly ovate-lanceolate, short-acuminate and acute, plicate or striate, open when moist; upper cells oblong, the others narrow. Perichetial leaves short-acuminate. Capsule suboblong; teeth split; endostome indistinct; lid conic, acute. — On trees, less often on rocks. *Eur.* common. Sweden, Norway, Germany, Switzerland, Italy! *Amer.* r. Can.: Macoun.

* *L. morensis* Schwægrichen.

Leaves shorter, subovate, less striate; the perichetial longer acuminate. Capsule cylindric, slightly curved; endostome rudimentary; lid rostellate. — *Eur.*, southern districts, often frequent. Greece: Haussknecht. Italy: Arcangeli; E. Adlerz. France: Husnot. Spain: Dieck, com. Roell.

B. Pedicel of the capsule immersed or short-exserted. Leaves often denticulate or sinuolate at acumen, sometimes decurrent.

2. *L. brachypus* Bridel. — Sullivant icon. muscor.

Leaves (as in *L. sciuiroides*) ovate-oblong or broadly ovate-lanceolate, short-acuminate, more or less striate-plicate, decurrent; inner basal cells narrow. Capsule oval, partly immersed; teeth us. entire; lid rostrate. Branches often nearly simple. — Trees. *Amer.* U. S. not r.: Austin, com. Macoun; Canada? (sterile specimens): Macoun.

3. *L. julaceus* L.; Sull. l. c. — Hypnum L.; *Leucodon* Sull.

Differs from the last: Leaves shorter, broad-ovate with very short acumen, not striate, less decurrent, nearly spreading when moist. Capsule round-oval; teeth slightly split above; pedicel sometimes exserted, often curved or flexuous. Branches ramose. — Trees. *Amer.* U. S., northeastern slope: Sullivant, com. C. Mueller; Fitzgerald etc., com. Renauld and Cardot.

3. *Forsstrœmia* Lindberg.

A. Leaves entire or faintly sinuolate above; cells pellucid. Peristome whitish.

1. **F. trichomitria** Hedw. — *Pterigynandrum* H.; *Forsstrœmia* Lindb.; *Leptodon* Mohr; Sulliv. ic. musc.

Leaves gen. ovate-oblong, short-acuminate, often faintly striate, sinuolate at acumen; middle cells oblong-lanceolate; costa indistinct. Capsule oblong or subcylindric, exserted; lid rostrate; pedicel not or partly exserted. — On trees, r. on rocks. *Amer.* Can.; Macoun. U. S.: Sullivant, com. C. Mueller; Austin, com. Macoun.

2. **F. immersa** Mohr. — *Leptodon* Mohr; *Forsstrœmia* Kindb.

Differs from the last: Branches shorter; leaves subovate; capsule smaller, oval and nearly immersed. — *Amer.* U. S. r.: Sullivant, com. C. Mueller.

3. **F. floridana** Lindb. — *Leptodon* Lindb.; *Forsstrœmia* Kindb.

Differs from *F. trichomitria*: »Leaves broader, ovate, abruptly acuminate; cells larger and broader; capsule half as large; pedicel longer, not diverging from the stem»: Lindb. — *Amer.* r. »U. S.»: Lindberg (not seen).

4. **F. ohioënsis** Lindb. — *Leptodon* Sull. icon. musc.

Leaves broad-ovate, abruptly narrowed to a very short, faintly sinuolate acumen, not striate; middle cells oval-oblong; costa thick. Capsule suboval, exserted; lid short-apiculate; pedicel partly emergent. — Trees. *Amer.* U. S. r.: Sullivant, com. C. M.

B. Leaves (at least the younger ones) denticulate above; cells very chlorophyllose, not pellucid. Capsule red-mouthed; teeth brown or red.

5. **F. nitida** Lindb. — *Leptodon* Sull. l. c.

Leaves ovate or broadly ovate-oblong, short-acuminate acute, faintly or not striate; middle cells suboblong, the alar ones often more dilated; costa very short or vanishing near the middle. Capsule suboval or subglobose, immersed or partly emergent; teeth pale brown; lid apiculate. — Trees. r. *Amer.* Canada: Macoun.

6. **F. Ravenelii** Austin. — *Cryphæa* Aust.; *Forsstrœmia* Kindb.

»Leaves round-ovate obtuse; areolation uniform; costa reaching above the middle. Capsule oval, immersed; teeth red; lid acute»: Lesq. et Jam. — *Amer.* »U. S. r.: Ravenel»: Lesq. et Jam.

4. **Cryphæa** Mohr.

A. Leaves entire; costa abbreviate.

a. Leaves small; the inner perichetial truncate or obtuse.

1. **C. glomerata** Br. eur.; Sulliv. icon. musc.

Leaves ovate, subacute, sometimes short-acuminate, nearly spreading when moist; upper cells narrow, the middle suboval; costa reaching to the middle or shorter. Perichetial leaves suboblong; costa broad, long-excurrent. Capsule ovate-oblong; teeth whitish, much surpassing the endostomial segments; calyptra cucullate, scabrous at apex. — Trees r. *Amer.* U. S.: com. Cardot.

2. **C. pendula** Lesquereux et James.

Differs from the last: Leaves broad-ovate; upper cells rhombic-oval, the inner basal linear; costa often reaching above the middle. Perichetial leaves broader, suboval, the outer acuminate with abbreviate costa, the inner ones obtuse with long-excurrent costa. »Lid of the capsule conic obtuse; calyptra conic, entire, hispid to below the middle. Branchlets sometimes filiform and flagellate»: Lesq. et Jam. man. — Trees (on Tillandsia); *Amer.* U. S. r.: Ravenel, herb. James, com. C. Mueller.

b. Leaves somewhat large, the perichetial acuminate or acute.

3. **C. arborea** Hudson. — Sphagnum Huds.; Cryphæa Lir d-berg.

Leaves ovate or ovate-oblong, gen. acute, sometimes short-acuminate, recurved, patent when moist; upper cells rhombic, the basal (at the insertion) orange; costa reaching above the middle. Perichetial leaves narrower, entire; costa gen. long-excurrent. Capsule oblong, red-mouthed; teeth yellow below, pale above; endostomial segments nearly as high; lid rostellate; calyptra mitriform, scabrous. — On trees, r. on rocks. *Eur.* England: Rogers. France: Le Jolis; Berthoumieu. Italy: Ar-cangeli.

4. **C. Lamyi** Montagne; Husnot; Kindb. revue bryol. 1895.

Differs from the last: Leaves broad-ovate, subobtusely, slightly recurved; lower basal cells hyaline. Perichetial leaves denticulate. Capsule shorter, oval; lid apiculate; calyptra cucullate. — Inundated rocks and trees r. *Eur.* Portugal: I. Newton, com. Brotherus.

B. Leaves sinuolate at acumen; costa subpercurrent but not excurrent (also in the perichetial leaves).

5. **C. nervosa** Hooker et Wilson; Sull. ic. musc.

Leaves small, from ovate-oblong base acuminate; upper cells narrow, the middle suboval. Perichetial leaves narrower, longer acuminate, serrulate above. Capsule ovate; lid conic obtuse; teeth whitish, much surpassing the endostomial segments; calyptra cucullate, scabrous at apex. — Trees r.; *Amer.* U. S.: com. Cardot.

5. **Antitrichia** Bridel.

A. Upper leaf-cells narrow. Pedicel of capsule elongate.

1. **A. curtispindula** L. — Hypnum L.; Antitrichia Brid.

Leaves striate, from ovate base abruptly acuminate or ovate-lanceolate, narrowly reflexed to the denticulate acumen; nerves 3, the median reaching into acumen. Perichetial leaves serrulate at acumen. Capsule oblong; lid apiculate; pedicel curved or flexuous. Perigonal leaves very short. Stem pinnate. — Rocks and trees. *Eur.* gen. common, Sweden, Switzerland! *Amer.* r. Can.: Macoun.

2. **A. gigantea** (Sull. et Lq. as var.) Kindb. rev. bryol. 1895.

Leaves larger, not striate, broadly ovate-lanceolate, broadly recurved to the nearly entire or minutely denticulate acumen; nerves gen. 5, the median vanishing far below acumen. Perichetial leaves entire. Capsule oblong cylindric; pedicel straight. — *Amer.* not r. in Pacif. distr. Alaska: J. M. Macoun. Can.: J. Macoun. U. S. Oregon: J. A. Hertzman, com. E. Nyman

3. **A. tenelia** Kindb. bull. Torr. club XVII.

Differs from **A. curtispindula**: Leaves smaller, not striate, ovate acute, recurved all around, denticulate at apex; cells gen. shorter; median nerve more abbreviate. Perigonal leaves longer. Stem irregularly divided with numerous very short branches. Only male plants found. — Rocks r. *Amer.* Can. Pacif. distr.: Macoun.

B. Upper leaf-cells oval-oblong. Pedicel short-emergent.

4. **A. pseudo-californica** Kindb. check-list of *Eur.* and N. *Amer.* mosses. — *Neckera californica* Hooker et Arnott; *Alsia* Sull.

Leaves ovate obtuse or short-acuminate acute, not striate, nearly entire; nerves 3, the median reaching gen. to middle. Perichetial leaves long-acuminate. Capsule cylindric-oval; lid rostrate; pedicel straight. Stem pinnate with very short branches. — *Amer.* Pacif. distr. U. S.: Miss Mann, com. Cardot.

Fam. 2. **Anomodontaceæ.**

6. **Anomodon** Hooker et Taylor.

I. **Eu-Anomodon.** Leaves distinctly papillose, r. recurved, not r. large, often crisped when dry. Secondary stems often erect.

II. **Leskeella.** Leaves nearly smooth, small, us. recurved, gen. appressed when dry. Stem us. creeping.

I. **Eu-Anomodon.**

A. Leaves large very broad at base, not subulate, crisped; borders undulate not recurved; inner basal cells sublinear pellucid,

other cells rotundate-quadrate opaque. Branches thick uniform irregularly divided, not flagelliferous.

1. **A. viticulosus** L. — Hypnum L.; Anomodon Hook. et T.

Leaves from ovate base tapering to an obtuse or subacute acumen, quite entire. Perichetial leaves with narrower, acute or subfiliform acumen. Capsule large subcylindric; teeth twice longer than endostome; lid rostellate; pedicel yellow. — Stone and trees. *Eur.* nearly common. Sweden, Norway, Germany, Switzerl., Italy! *Amer.* r. Can.: Macoun.

2. **A. apiculatus** Br. eur.; Suil. ic. m. — Hypnum Rugelii C. M.

Leaves from broad-ovate or cordate subfimbriate base abruptly contracted to a narrow sublinear obtuse or apiculate acumen. Perichetial leaves with sublinear obtuse acumen. Capsule large subcylindric; segments very short or rudimentary; lid apiculate; pedicel red. — Rocks and trees r. *Eur.* Sweden 1859! Norway 1862! *Amer.* Can.: Macoun.

3. **A. platyphyllus** Kindb. note on Can. bryol. 1893.

Leaves short very broad, ovate or ovate-oblong or from cordate strongly papillose base slightly contracted to a lingulate blunt acumen. Perichetial leaves with subdentate strongly papillose base and narrow lingulate acumen. Capsule small oval-oblong; segments rudimentary; lid short-conic not apiculate; pedicel yellow very much shorter than in the last. — Trees r. *Amer.* Can.: Macoun.

B. Leaves gen. small and appressed or suberect when dry. Branches not thick.

a. Leaves very broad at base, not subulate-acuminate.

4. **A. minor** Beauvois. — Neckera B.; Anomodon Fuernrohr; A. obtusifolius Bruch et Sen.; Suil. ic. m.

Leaves from subovate base abruptly tapering to a linear-lingulate acumen, subdistichous when moist; borders entire undulate not recurved; cells round-quadrate opaque except the few sublinear at base. Perichetial leaves with narrow lingulate acumen. Capsule small suboval; segments short or rudimentary; lid rostrate or rostellate; pedicel yellow not long. Plants glaucous green. — Trees. *Amer.* Can. r.: Macoun. U. S.: Sullivan, com. C. Mueller; com. Roell and Cardot.

5. **A. attenuatus** Schreber. — Hypnum Schreb.; Anomodon Huebener.

Leaves from subovate base abruptly tapering to a shorter, gen. subacute denticulate acumen; borders not recurved; cells as in the last. Perichetial leaves with sublinear-subulate acu-

men. Capsule small cylindric; segments often long; lid rostrate; pedicel red. Branches long not compressed, often curved when dry; branchlets often flagellate, their leaves narrow often subulate. Tufts intricate. R. fruiting. — Rocks and trees, not uncommon. *Eur.* Sweden, France, Switzerl., Italy! *Amer. Can.*: Macoun. U. S.: Purpus, com. Roell.

6. *A. californicus* Lesquereux.

»Leaves broadly ovate acute, very papillose and fimbriate at the auricled base, decurrent; borders recurved; upper cells ovate-quadrate. Capsules unknown. — *Amer. U. S.*: Lesq. et Jam.

b. Leaves subulate-acuminate entire. Tufts intricate. Branchlets often flagelliform.

7. *A. longifolius* Schleicher; Pterogonium Schl.; Anomodon Bruch.

Leaves ovate-lanceolate gradually acuminate, long-decurrent, not recurved; cells round-quadrate; costa subpercurrent. Capsule cylindric; teeth twice longer than endostome; lid apiculate. Tufts pale green. Very r. fruiting. — Rocks and trees below alps gen. r. *Eur.* Sweden not r., Switzerl.!

8. *A. rostratus* Hedwig. — Leskea H.; Anomodon Schimper.

Leaves from subovate base abruptly acuminate often with hyaline hairpoint; borders recurved gen. to acumen; cells as in the last; costa reaching to acumen or shorter. Capsule oval-oblong; teeth about twice longer than endostome; lid rostrate or rostellate. Tufts us. pale green above and rusty red below, r. wholly dark green. — Rocks and trees. *Eur. r.* Switzerl.!

Amer. not r. *Can.*: Macoun; Waghorne. U. S.: Roell; Sullivan, com. C. Mueller.

II. *Leskeella* Limpricht, in part.

A. Costa of leaves short, in the perichetial obsolete.

9. *A. tectorum* Al. Braun. — Pterogonium Braun; Anomodon Kindb.; Pseudoleskea Schimper.

Leaves with ovate base and gen. short (sometimes long falcate) acumen, acute, recurved below; middle cells oval-oblong; costa vanishing far below acumen, sometimes forking. Capsule cylindric; teeth yellow; segments long without basal membrane; lid rostellate; pedicel short. Stem pinnate creeping, julaceous when dry. Leaves sometimes smaller than in *A. nervosus*. Very r. fruiting. — On roofs and rocks, r. on walls or trees, gen. r. *Eur.* Norway! Germany: Roell. *Amer.* »Greenl.»: Berggren.

10. *A. subrigidulus* Kindb. n. sp.

Differs from the last: Leaves more distinctly recurved to the short acumen; middle cells round-oval; costa gen. reaching to

acumen. Stem irregularly divided not creeping. Capsule and lid as in the last; peristome not seen. — Rocks r. *Amer.* Can. Labrador: Waghorne.

B. Costa of leaves long, also in the perichetial.

11. *A. nervosus* Bridel. — *Pterigynandrum* Brid.; *Anomodon* Huebener; *Leskea* Myrin.

Leaves from short subovate base abruptly tapering to a long subulate filiform-pointed acumen, recurved to it; middle cells round-oval; costa subpercurrent or long-excurrent. Perichetial leaves entire long-acuminate. Capsule oblong cylindric; teeth orange; segments short or rudimentary with indistinct basal membrane; lid rostellate; pedicel short. Stem creeping; branches pinnate subjulaceous. R. fruiting. — Rocks and trees. *Eur.* not r. Sweden, Norway, Switzerl.! *Amer.* r. Can. less r.: Macoun; Waghorne.

12. *A. heteroideus* C. M. et Kindb. catal. Canadian musci.

Leaves gradually acuminate without filiform point, not recurved to acumen; middle cells roundish; costa not percurrent, shorter and fainter than in the last. Perichetial leaves denticulate or sinuate. Capsules unknown. Branches not distinctly julaceous; branchlets flagelliform with very small nerveless leaves. — Rocks and trees r. *Amer.* Can.: Macoun; Waghorne.

13. *A. Moseri* Kindb. — *Leskea* note on Can. bryol. 1893.

Leaves as in *A. nervosus* but smaller; cells more rotundate. Perichetial leaves narrowly ovate-oblong, obtusate or short-acuminate, denticulate at least above middle. Capsule lanceolate-cylindric small-mouthed; teeth pale; segments as high with distinct basal membrane; lid apiculate; pedicel twice longer than in *A. nervosus*. — On earth r. *Eur.* Can.: J. Moser, com. Macoun.

14. *A. rupestris* Berggren. — *Leskea* Bgr.; *Anomodon* Kindb.; »*Leskea nervosa*»; Milde and Limpricht.

Leaves smaller than in *A. nervosus*, narrowly ovate-oblong or ovate-lanceolate, shorter acuminate, not recurved; cells oblong; costa not much prolonged into acumen. Tufts brownish or olivaceous. Capsules unknown. — Rocks in alp. region r. *Eur.* Norway!

15. *A. rigidulus* Kindb. Laubm. Schw. u. Norw. — »*Leskea nervosa*» Limpricht.

Leaves much shorter than in *A. nervosus*, broadly recurved all around; middle cells rotundate; costa percurrent. Stem-leaves round-ovate obtuse; branch-leaves ovate-oblong gen. obtusate

acute, r. short-acuminate. Stem irregularly divided not creeping; branches quite julaceous. Capsules unknown. — Rocks in alp. region r. *Eur.* Norway near Kongswold!

7. **Lindbergia** Kindberg, new genus.

1. **L. brachyptera** Mitten. — *Pterogonium* Mitt.

Leaves from broad-oval base contracted to a subulate acumen, slightly reflexed below, faintly denticulate only at acumen, strongly papillose, subclaviculiform (as in *Heterocladium*) and spreading when moist, nearly appressed when dry; upper cells rotundate, middle suboval, angular very numerous; costa reaching above middle. Capsule erect suboblong pale; teeth short yellow, connate at base; lid conic; pedicel yellow-red. — Old logs r. *Amer.* Can. Ontario; Macoun.

Fam. 3. **Fabroniaceæ.**

8. **Fabronia** Raddi.

A. Leaves dentate-ciliate or fimbriate; upper and middle cells oval-oblong; costa short or indistinct. Capsule with low convex often mamillate lid. Calyptra us. broad.

1. **F. octoblepharis** Schleicher. — *Pterogonium* Schl.; *Fabronia* Schwægrichen.

Leaves gen. ovate-oblong and not fimbriate with subulate-filiform point; costa often distinct. Perichetial leaves serrate above. Capsule obovate or suboblong; teeth brownish us. connate in pairs; calyptra broad. — Rocks and stonewalls. *Eur.* south. distr. somewhat r. Switzerl.! *Amer.* r. »U. S.»: Lq. et Jam.

***F. pusilla** Raddi.

Leaves us. narrower, gen. ovate-lanceolate fimbriate with longer and filiform hyaline point; costa often indistinct. Perichetial leaves sharply serrate also below. Capsule often subglobose; teeth yellowish often finally free. — Princ. on trees, r. on rocks. *Eur.* not r. in south. distr. Italy! *Amer.* r. Can.: Macoun.

2. **F. gymnostoma** Sullivant et Lesquereux; Sull. ic. m.

Leaves gen. costate and ciliate; perichetial irregularly dentate. Capsule obovate; peristome wanting; calyptra narrow. Not much differing from *F. octoblepharis* in barren state. — *Amer.* r. U. S.: Wright, com. C. Mueller; Fendler, com. Renault.

B. Leaves serrulate with small not ciliiform teeth; upper and middle cells narrow; costa us. distinct.

a. Leaves short-costate. Capsule with conic lid; calyptra narrow.

3. **F. Wrightii** Sullivant icon. muscor.

Leaves ovate-lanceolate gradually tapering to an often long

filiform point. Perichetial leaves denticulate all around. Capsule piriform; teeth orange gen. not connate. Branches somewhat thicker than in *F. octoblepharis*. — *Amer. r. U. S.*: Wright, com. C. Mueller.

4. *F. Ravenellii* Sullivant icon. muscor.

Leaves ovate-oblong, broader than in the last with smaller teeth and less gradually tapering to the often short point. Perichetial leaves entire below, faintly serrulate above. Capsule subcylindric or narrowly piriform; teeth brownish not connate. Branches thickish often curved and subjulaceous when dry. Habit of *Pterygynandrum*. — Logs r. *Amer. Can.*: Macoun. U. S.: Fitzgerald, com. Cardot.

b. Leaves long-costate. Stem with flagelliform shoots. Capsule unknown.

5. *F. Sendtneri* Schimper.

»Leaves ovate-lanceolate; costa vanishing below acumen»: Limpricht. — Rotten logs r. *Eur.* »Istria: Sendtner»: Schimper.

9. *Clasmatodon* Hooker et Wilson.

1. *C. parvulus* Hampe. — Leskea Hampe; *Clasmatodon* Sulliv. ic. musc.; *Anisodon Bertrami* Schimper.

Leaves ovate acute sometimes short-acuminate, minutely serrulate above middle; upper cells oblong, lower inner oblong-lanceolate; costa reaching to middle. Perichetial leaves abruptly narrowed to a long sublinear denticulate acumen. Capsule oval-oblong; teeth yellow; lid conic; pedicel more or less elongate. — Trees. *Amer. U. S.* less r.: com. Macoun, Levier and Cardot. *Eur.* »Germany: Bertram»: C. M.

2. *C. rupestris* (Sull. et Lq. as var.) Kindb. rev. bryol. 1895.

Leaves broad-ovate obtuse entire; upper cells rhombic-oval, lower suboblong; costa vanishing below middle. Perichetial leaves gradually narrowed to the entire acumen. Capsule round-oval; teeth orange; lid low convex; pedicel short. — Rocks r. *Amer. U. S.*: com. Macoun.

10. *Habrodon* Schimper.

1. *H. perpusillus* Notaris. — *Pterogonium* Not.; *Habrodon* Lindb.

Leaves ovate-oblong acute short-acuminate with gen. short filiform point, entire or at acumen faintly sinuate; upper cells rhombic, middle oval-oblong, lower inner oblong-lanceolate. Capsule oblong-cylindric; teeth hyaline distant without basal membrane; lid conic. Very r. fruiting. — Trees r. *Eur. Italy, Switzerl.*! *Amer.* »U. S.»: Sulliv.

11. **Anacamptodon** Bridel.

1. **A. splachnoides** Froehlich. — *Orthotrichum* Fr.; *Anacamptodon* Brid.

Leaves entire ovate-oblong short-subulate; inner cells suboblong; costa vanishing near middle. Capsule suboblong or oval with short neck; teeth dark purplish united in pairs, much longer than segments; lid rostellate; pedicel long thick reddish. Monoecious. — Rotten branches of trees r. *Eur.* France: Schimper; Husnot; Berthoumieu. *Amer.* »U. S.»: C. M.

Fam. 4. **Pterobryaceæ.**

(*Endotrichacæ* Kindb. in »Genera of Eur. and N. Amer. Bryineæ».)

12. **Pterobryum** Hornschuch.

1. **P. cymbifolium** Sullivant. — *Pilotrichum* Sull. ic. m.; *Pterobryum* Mitten.

Leaves concave from ovate-oblong base gradually short-acuminate, not recurved; lower basal cells orange, alar very numerous; costa reaching to acumen. Perichetial leaves nerveless. Stem subpinnate above; branches turgid julaceous. Capsules unknown. — *Amer.* r. U. S. Florida: Sullivant, com. C. Mueller.

2. **P. Ludovicæ** C. Mueller. — *Neckera* C. M.; *Pterobryum* Kindb.

Differs from the last: Leaves longer-acuminate abruptly narrowed; alar cells less numerous; costa percurrent or vanishing in acumen. Perichetial leaves with long-excurrent costa. Capsule exserted; pedicel short; peristome not seen. — Trees r. *Amer.* U. S.: com. Macoun and Cardot.

Fam. 5. **Neckeraceæ.**

13. **Neckera** Hedwig.

A. Capsule not annulate Stem us. pinnate.

a. Leaves with long sharply dentate-spinulose acumen; upper cells narrow; costa short double or indistinct.

1. **Douglasiella**. Leaves us. undulate. Capsule more or less emergent; endostome as high as teeth. Dioecious.

b. Leaves obtusate or short-acuminate, not or faintly denticulate; upper cells gen. wide.

aa. Leaves with long simple costa. Endostomial segments long. Paraphyllia us. numerous.

II. **Menziesiella**. Leaves undulate. Capsule immersed. Dioecious.

bb. Leaves with short double or indistinct costa. Endostomial segments short or rudimentary. Paraphyllia few or wanting.

III. Eu-Neckera. Leaves undulate sublinear-ovate; middle and lower cells gen. narrow. Capsule often immersed. Often monoecious.

IV. Lelophyllum. Leaves not undulate often short; middle cells sometimes wide. Capsule gen. long-exserted. Branches often flagelliferous. Dioecious.

B. Capsule annulate. Stem not distinctly pinnate.

V. Homalia. Leaves not undulate; costa sometimes simple but abbreviate. Capsule long-exserted. Branches not flagelliferous. Monoecious or dioecious.

I. Douglasiella Kindb.

1.N.Douglasii Hooker.

Leaves large undulate with cordate base, sublinear-lanceolate broad acuminate, faintly denticulate below acumen sometimes to middle, entire in lower part, only at angles sinuate; teeth of acumen sometimes hooked; cells gen. fusiform-linear orange at insertion, alar short wide. Perichetial leaves filiform-pointed. Capsule red oval-oblong; pedicel us. triply longer; teeth pale yellow. Plants pale green, finally becoming whitish. Stem very long; flagellæ often longish. Trees and rocks. *Amer. Pacif. distr. Can.: Macoun. U. S.: Boker, herb. Lesquereux, com. Renauld.*

2.N.cephalonica Juratzka; Kindb. rev. bryol. 1895.

Leaves small not undulate and not distinctly cordate, from broader and entire basal part gradually tapering to the long subulate often filiform-pointed acumen; its teeth not hooked; cells narrow sublinear at insertion yellowish, alar not distinct. Stem short. Capsules unknown. Dioecious. — *Eur. r. »Greece: Unger».* Juratzka. (*Africa, Madeira: Liebetrut, com. C. Mueller.*)

II. Menziesiella Kindb.

A. Capsule immersed longer than pedicel; segments as high as teeth or higher. Leaves finally brown.

3.N.Menziesii Hooker; Sullivant icon. musc.

Leaves sublinear broader below, faintly denticulate above middle; apical and alar cells dilated, the others narrow. Capsule suboval; teeth orange. Branches us. distant with numerous flagellæ. Stem often very long. — Rocks and trees. *Amer. Pacif. distr. not r. Can.: Macoun. U. S.: Roell; Mrs L. C. Feely; Henderson, com. Cardot.*

***N. amblyclada** Kindb. (cat. Can. m., as var.).

Branches crowded obtuse r. and sparingly flagellate. Leaves suboblong shorter; cells dilated, upper subrhombic, lower oblong, inner basal narrow. Capsules unknown. — Rocks r. *Amer.* Can. Pacif. distr. in subalp. region: Macoun.

4.N. turgida Juratzka.

Leaves sublinear-oblong sometimes denticulate to below middle; apical and alar cells dilated, the others narrow. Branches us. crowded obtuse; flagellæ few and short. »Capsule oblong-cylindric; teeth yellowish brown»: Limpricht. — Rocks and trees r. *Eur.* Germany: Geheeb.

***N. jurassica** Amann; Limpricht.

»Leaves subsecund; cells gen. subrhombic. Capsules unknown. — Rocks r. *Eur.* Switzerl.: Amann»: Limpricht.

B. Capsule partly emergent above perichetial leaves, not longer than pedicel; segments unknown. Leaves us. yellowish green.

5.N. mediterranea Philibert.

Leaves subovate-oblong gen. nearly entire; inner lower cells narrow, the others dilated. Capsule suboval; teeth pale yellow. Branches often distant; flagellæ short. — Rocks r. *Eur.* France: Philibert; Payot, com. Husnot.

III. Eu-Neckera.

A. Pedicel of capsule long-exserted. Leaves large strongly undulate us. shining and finally becoming brown. Dioecious.

6.N. crispa L. — Hypnum L.; Neckera Hedwig.

Leaves gen. sublinear obtusate; perichetial long-sheathing short-pointed. Capsule oval; segments distinct, basal membrane obsolete. Branches sometimes turgid and less distinctly pinnate. — Rocks princ. not shaded. *Eur.* not r. Sweden, Switzerl.!

B. Capsule wholly immersed. Leaves large strongly undulate green not glossy. Monoecious.

7.N. pennata L. — Fontinalis L.; Neckera Hedwig.

Leaves gen. sublinear obtusate, those of younger branches us. longer-acuminate with narrower apical cells; perichetial gradually acuminate long-pointed. Capsule oval; endostome rudimentary. Stem rigid. — Us. on trees r. on shaded rocks in woods, somewhat r. *Eur.* Switzerl.! *Amer.* Can.: Macoun; Moser; Waghorne.

C. Capsule with shortly or not exserted pedicel. Leaves less large not strongly undulate us. green; apical cells short.

a. Dioecious r. fruiting. Capsule with emergent pedicel; endostomial segments distinct. Leaves somewhat small,

8. *N. pumila* Hedwig.

Leaves sublinear-oblong gen. acute, more or less acuminate or filiform-pointed, slightly undulate, often recurved below at one side and inflexed at the other. Capsule oblong; teeth pale yellow; basal membrane of endostome distinct. Often with propagula. — On trees r. on rocks, princ. below alp. regions. *Eur.* Switzerl.! *Amer.* »U. S.«: Cardot.

b. Monoecious not r. fruiting. Capsule partly emergent; endostome rudimentary.

9. *N. oligocarpa* Bruch.

Leaves gen. sublinear-oblong short-acuminate; costa very short. Perichetial leaves gradually acuminate. Capsule round-oval; teeth pale yellow. Stem not rigid; branches us. pinnate. — On rocks r. (in *Amer.*) on trees, princ. in alp. regions, r. *Eur.* Sweden, Norway! *Amer.* Can.: Macoun.

10. *N. pterantha* C. M. et Kindb. cat. Can m. (as subspecies).

Leaves as in the last but larger, often brown-green; costa longer. Perichetial leaves abruptly short-acuminate. Capsule round-oval; teeth white hyaline; antheridia and archegonia more numerous than in the last. Branches rigid, gen. simple and very long. — Rocks r. *Amer.* Can. Rocky mts: Macoun.

IV. *Leiophyllum* C. Mueller syn. musc.

A. Leaves obovate arrounded at apex.

11. *N. Besseri* Lobarzewski. — *Omalia* Lob.; *Neckera* Juratzka.

Leaves small denticulate above, often shining; cells dilated, middle and lower suboval. Perichetial leaves gradually acuminate. »Capsule oval subemergent; endostome incomplete with indistinct basal membrane«: Limpricht. — On rocks, r. on trees, r. *Eur.* Norway, Switzerl.!

B. Leaves not arrounded at apex, gen. somewhat narrow.

a. Leaves narrow-oblong or sublanceolate. Capsule long-exserted oval-oblong; segments and basal membrane distinct.

12. *N. complanata* L. — *Hypnum* L.; *Neckera* Huebener.

Leaves short-acuminate acute, minutely denticulate in upper third; middle and lower cells linear-lanceolate, alar subquadrate. Outer perichetial leaves abruptly acuminate. — On trees, less often on rocks. *Eur.* common. Sweden etc.! *Amer.* r. Can.: Waghorne.

b. Leaves (at least the upper) short and gen. obtusate, smaller than in the last. Capsules unknown.

13. *N. gracilis* James. — *Homalia* Jam.; Sull. ic. m.; *Neckera* Kindb.

Leaves oval-oblong indistinctly denticulate all around; middle cells rhombic, lower subrectangular-linear, alar subquadrate. — Rocks r. *Amer.* U. S.: Peck, com. Macoun.

14. *N. tenella* Kindb. Laubm. Schwed. u. Norweg.

Leaves gen. broad-oval, upper denticulate nearly all around; middle and lower cells oblong, lowest basal shorter and yellow. — Rocks in lower subalp. districts r. *Eur.* Norway in Gudbrandsdal! Sweden in Medelpad: M. Huss.

V. *Homalia* Bridel, as genus.

A. Leaves dentate subfimbriate at apex, denticulate below; costa reaching above middle. Capsules unknown.

15. *N. lusitanica* Schimper. — *Homalia* Sch.; *Neckera* Kindb.

Leaves obovate subobtusate shining; only a single apical tooth prominent. — Rocks r. trees, r. *Eur.* Mediterr. distr. France: Boulay and Espagne, com. Husnot. Italy: Bottini; Arcangeli. Portugal: Levier.

B. Leaves denticulate near apex, nearly entire below; costa vanishing near middle, sometimes shorter and double.

16. *N. trichomanoides* Schreber. — *Hypnum* Schreb.; *Neckera* Hartman.

Leaves subacute or obtuse (sometimes subacuminate) with several prominent apical teeth, us. subobovate or spathulate, shining when dry. Inner perichetial leaves with patent subulate acumen. Capsule ovate-oblong; segments entire or rimose; beak of lid nearly as long as capsule. Monoecious us. fruiting. — Trees, stones and earth. *Eur.* gen. common. Sweden, Norway, Germany! »*Amer.*»: Lesq. et Jam.

17. *N. Jamesii* Schimper. — *Homalia* Sch.; *Neckera* Kindb.

Leaves minutely denticulate all around or nearly entire, neither apiculate nor acuminate, otherwise as in the last. »Capsule with shorter peristome; lid shorter rostellate»: Schimp. syn. R. fruiting. — Rocks r. *Amer.* Can.: Macoun; Waghorne. U. S.: James, com. C. Mueller.

18. *N. Macounii* C. M. et Kindb. — *Homalia* cat. Can. m.; *Neckera* Kindb.; *Homalia* obtusata Lesq. et Jam., non Mitten.

Leaves arrounded at apex, denticulate to middle, gen. linguulate and faintly or not glossy, finally yellow at insertion. Inner perichetial leaves suddenly narrowed to the erect sublinear obtuse acumen. Capsule suboblong; beak of lid much shorter; segments rimose. R. fruiting. Probably dioecious; male flowers not found. — Trees and rocks. *Amer.* Can.: Macoun; Moser; Waghorne.

14. Neckeropsis Reichardt (rather a subgenus of *Neckera*).

1. N. undulata Hedwig. — *Neckera* H.; *Neckeropsis* Reich.

Leaves undulate sublinear-lingulate with broader and cordate base, faintly denticulate all around; upper cells rhombic, middle and lower lanceolate-linear. Stem creeping. »Capsule immersed cylindric-oblong; teeth yellow; segments carinate as high; calyptra mitriform sparingly hairy»: C. M. syn. — Trees r. *Amer.* U. S.: Fitzgerald, com. Renauld. (Cuba: Wright, com. C. Mueller).

2. N. disticha Hedwig. — *Neckera* H.; *Neckeropsis* Kindb.

Leaves not undulate, sublingulate entire or above middle indistinctly denticulate; upper and middle cells rhombic-oval, basal and lower marginal linear. »Capsule subemergent oblong-cylindric; teeth pale; segments as high, split to base; calyptra conic dimidiate glabrous»: C. M. syn. — Trees r. *Amer.* U. S.: Austin, com. Macoun.

15. Porotrichum Bridel.

1. P. Bigelowii Sullivant. — *Hypnum* Sull.; *Porotrichum* Kindb.

Leaves distant nearly plane, but involute at one side of base, obtusate acute sharply serrate above, sublinear-lanceolate or sublingulate; upper cells hexagonal-oval, middle oblong, lower sublinear; costa smooth long not percurrent, sometimes forking above. Capsule obovate; lid long-rostrate; pedicel curved above. Branches distant. Tufts bright green often glossy. — Wet rocks r. *Amer.* Pacif. distr. Can: Macoun. U. S.: Mrs L. C. Feely; E. Hall, com. Macoun; com. Renauld and Cardot.

Fam. 6. **Leptodontaceæ.**

16. Leptodon Mohr.

1. L. abietinus Hooker. — *Neckera* Hook.; *Leptodon* Kindb.; *Alsia* Sulliv. ic. muse.; *Leptodon circinnatus* Sull.

Leaves serrulate gen. in upper third, mamilliose-spinulose above at back and costa, more or less acuminate, acute or subobtuse at apex, gen. ovate-oblong or (those of stem) ovate-lanceolate, recurved below, often involute at acumen; cells very small and gen. oblong-linear, alar sometimes subquadrate; costa long not percurrent. Inner perichetial leaves convolute obtusate apiculate. Capsule red oval-oblong; teeth whitish; segments long rimose; calyptra and vaginula glabrous. Stem us. erect, sometimes bipinnate, its naked part us. long; branches crowded not flagelliferous; paraphyllia broad fimbriate. — Trees and rocks r. *Amer.* Pacif. distr. Can: Macoun. U. S.: Bolander, com. C. Mueller; Miss Mann, com. Cardot; Mrs L. C. Feely; Hall, com. Macoun; Leiberg, com. Mrs Britton.

2. **L. Smithii** Dickson. — *Hypnum* Dicks.; *Leptodon* Mohr.

Leaves entire smooth obtuse oval-ovate recurved below middle; cells gen. rotundate, inner near costa sublinear, basal suboval; costa vanishing near or above middle. Inner perichetial leaves long-acuminate. Capsule reddish yellow oblong; teeth pale; segments rudimentary or wanting; calyptra and vaginula hairy. Stem ascending or decumbent, its naked part short; branches distant often flagelliferous; paraphyllia sublinear. R. fruiting. — Trees and stones r. *Eur.* common in mediterr. distr. France: Le Jolis; Husnot. Italy: Arcangeli. Austria: Berggren. Engl.: Davies, com. W. H. Pearson.

17. **Macouniella** Kindb. in check-list of *Eur.* and N. Amer. mosses.

1. **M. californica** Sullivant. — *Antitrichia* Sull. ic. m.

Leaves not striate, with ovate-oblong base and denticulate shorter acumen; lower cells lanceolate-oblong; costa reaching to acumen. Perichetial leaves entire gradually narrowed to a filiform-pointed acumen. Capsule oblong-cylindric gen. long-exserted; teeth pale; segments short with distinct longitudinal line; lid rostrate. Stem pinnate suberect; branches julaceous. Dioecious. — Trees r. *Eur.* Mediterr. distr. France: Renault, com. Gravet. *Amer.* Pacif. distr. Can.: Macoun. U. S.: Mrs Ames, com. Cardot.

Fam. 7. **Meteoriaceæ.**

18. **Papillaria** C. Mueller.

1. **P. nigrescens** Swartz. — *Hypnum* Sw.; *Papillaria* Sauerbeck et Jæger; *Meteorium* Mitt.; Lesq. et Jam.

Leaves entire from cordate base long-acuminate, ventricose in middle, faintly recurved below, involute-cucullate at apex, faintly papillose; cells minute, angular suboval seriate, inner basal sublanceolate; other cells oval-rhombic or rhomboidal. Stem thin subpinnate; branches with naked or at apex foliate flagellæ. »Capsule narrow-oblong; teeth white; lid rostellate»: C. M. Syn. »Endostome as in *Homalia*»: Lesq. et Jam. — Trees r. *Amer.* U. S.: Sawyer, com. Cardot.

***P. Donnellii** Kindb. n. subsp.; var. *Donnellii* Austin m. Apalach.

Stem and branches thicker. Leaves not distinctly papillose, abruptly short-acuminate. Capsules unknown. — *Amer.* r. U. S. Florida: Donnell Smith, com. Macoun.

19. **Meteorium** Bridel.

1. **M. pendulum** Sullivant icon. muscor.

Stem-leaves minute narrowly ovate-lanceolate long-acuminate filiform-pointed, minutely denticulate below, nearly entire above. decurrent, not or faintly recurved, papillose at back, patent when dry. Branch-leaves denticulate all around, sublinear or subulate-acuminate; costa faint reaching to acumen. Capsule minute suboval; pedicel about twice longer; teeth yellowish; segments nearly as high; lid apiculate. Stem long filiform subpinnate; branches flagellate very long. — Trees in subtropical distr. r. *Amer. U. S.*: Congdon, com. Macoun; Langlois, com. Cardot.

2. *M. floridanum* Austin. — *Neckera* Aust.; *Meteorium* (?) Kindb.

» Leaves concave cymbiform plicate obsoletely papillose, narrowly oblong-lanceolate, broadly revolute, entire or obsoletely serrulate; cells minute, the basal broader; costa vanishing above middle. Primary stem creeping with nerveless leaves; secondary stems somewhat compressed, pendent or erect. — Trees r. *Amer. U. S.*: Lesq. et Jam.

Fam. 8. **Hookeriaceæ.**

20. **Hookeria** Taylor.

1. *H. lætevirens* Taylor. — *Cyclodictyon* Mitten.

Leaves elliptic-obovate obtusate filiform-pointed, slightly serrulate above; lower cells hexagonal-oval; nerves reaching above middle. Capsule oval inclined or pendent; teeth purplish; segments entire as high with high basal membrane; lid long-acuminate or rostellate. Monoecious. — Rocks near water r. *Eur. Ireland*: Holt and Stewart.

2. *H. varians* Sullivant; Lesq. et Jam.

Leaves suboblong acute sometimes short-acuminate, nearly entire; cells round-hexagonal twice larger than in the last; nerves reaching to middle. Capsule oblong horizontal or pendent, very small; teeth purplish; segments entire; lid short-acuminate. Polygamous. — *Amer. r. »U. S.*: Lesq. et Jam. (Cuba: Wright, com. C. Mueller).

21. **Callicostella** C. Mueller.

1. *C. cruceana* Duby. — *Hookeria* Duby; *Callicostella* Sauerbeck et Jæger.

Leaves oblong-lingulate not limbate, not appressed when dry; upper cells papillose irregularly round-polygonal, lower short-rectangular. Capsule very small, oblong or ovate-cylindric; lid half as long; teeth dark purple, segments higher. Stem irregularly divided. Plants small. *Amer. r. »U. S.*: Lesq. et Jam. (Mexico: Duby, herb. C. M.)

22. **Pterygophyllum** Bridel.

1. **P. lucens** L. — Hypnum L.; Pterygophyllum Brid.

Leaves plane very large, round-ovate or suboval, arrounded at apex, pale-hyaline when emarceid; upper cells round-hexagonal, lower oblong. Perichetial leaves ovate-lanceolate acuminate. Capsule suboval horizontal or deflexed; teeth orange; segments orange entire as high, their basal membrane high; lid rostrate; pedicel long red. Tufts loose. Stem irregularly divided. Monoecious. Habit of *Mnium punctatum*. — Wet places princ. near rivulets. *Eur.* France: Zetterstedt. Italy: Arcangeli. Austria: Schmidt Germany: Huebner. Engl.: Cash; Holt. Norway: Ahnfeldt, com. S. Hardin. *Amer.* Pacif. distr. Alaska: J. M. Macoun. Can.: J. Macoun.

2. **P. Sullivantii** C. Mueller. — Hookeria Lq. et Jam.

Differs from the last: Leaves ovate or suboblong narrower and less large subacuminate subacute; cells oval-oblong nearly uniform. Capsules unknown. — Rocks r. *Amer.* U. S. Tennessee: Mrs Britton, com. C. Mueller.

23. **Daltonia** Hooker et Taylor.

1. **D. splachnoides** Smith. — Neckera Sm.; Daltonia H. T.

Leaves small entire from sublinear-lanceolate base tapering to a subsubulate shorter acumen; middle and lower inner cells oblong-lanceolate, marginal narrow-linear yellowish; costa reaching to acumen. Capsule small oval-oblong; teeth whitish or yellowish; segments entire as long without basal membrane; lid yellow rostrate; pedicel short. Plants small. — Rocks and trees r. *Eur.* Irel.: Holt; M'Ardle.

Fam. 9. **Leskeaceæ.**

24. **Thelia** Sullivant.

A. Leaves green fimbriate; their cilia not split.

1. **T. hirtella** Hedwig. — Pterigynandrum H.; Thelia Sull. ic. m.

Stem brown-tomentose; branches bilateral distant; paraphyllia numerous. Capsule subcylindric; teeth short; segments none; endostomial membrane elevate; lid rostrate; pedicel short. — Trees r. *Amer.* Can.: Macoun; Drummond n. 79; Lawson. U. S.: Roell; Sullivant, com. C. Mueller; com. Macoun and Cardot.

2. **T. robusta** Duby.

Differs from the last: Branchlets unilateral very crowded. Leaves r. simply costate. Endostomial segments obtuse. — *Amer.* r. U. S.: Lesq. et Jam.

3. **T. compacta** Kindb. in Ottawa Naturalist IV.

Stem brown-tomentose; branches unilateral crowded; paraphyllia none. Capsule suboblong; teeth short; segments none; endostomial membrane low; lid not rostrate; pedicel shorter than in *T. hirtella*. — Trees r. *Amer. Can.*: Macoun; Moser.

B. Leaves glaucous green; their cilia split. Lid of capsule rostrate. Endostomial segments distinct; basal membrane elevate.
4. *T. asprella* Schimper. — Leskea Sch.; Thelia Sull. ic. m.

Stem brown-tomentose; branches short more or less distant, not unilateral; paraphyllia present. Leaves fimbriate with bifurcate cilia. Capsule cylindric-oblong; teeth long; pedicel not long. — Trees r. *Amer. Can.*: Macoun. U. S.: Roell; Austin, com. Macoun.

5. *T. Lescurii* Sullivan icon. muscor.

Stem not tomentose; branches unilateral elongate crowded or distant; paraphyllia none. Leaves not fimbriate, sometimes obtusate obtuse; cilia divided in 2, 3 or 4 lobes. Capsule cylindric; teeth not long; pedicel longer than in the last. — Sandy ground or rocks r. *Amer. U. S.*: Austin, com. Macoun.

25. ***Pterygynandrum*** Hedwig.

1. *P. filiforme* Timm. — Hypnum T.; *Pterigynandrum* Hedw.

Leaves recurved below, serrulate above, often striate, us. decurrent and not appressed; upper cells oblong, lower linear-lanceolate; costa reaching to middle or shorter. Stem-leaves recurved nearly all around, subovate or obovate, often short-acuminate. Branch-leaves ovate-oblong obtusate subobtuse us. very papillose. Capsule oblong-cylindric; teeth hyaline or yellowish; segments short. Stem us. denudate at base, in American variety creeping. — Trees and stones. *Eur.* common princ. in southern distr. Switzerl., Germany, Sweden, Norway! *Amer.* not common. *Can.*: Macoun; Waghorne.

****P. papillosulum*** C. M. et Kindb. cat. Canad. m.

Differs in leaves neither striate nor decurrent, appressed when dry and not glossy; the younger subhyaline nearly smooth short-acuminate acute. Capsules unknown. — Rocks r. *Amer. Can.* Rocky mts: Macoun.

****P. decipiens*** Weber et Mohr. — Neckera W. M.; *Pterygynandrum* Lindb.

Leaves indistinctly decurrent, not striate, gen. obtusate, appressed when dry and not glossy; those of stem less recurved. Branches thicker. Very r. fruiting. »Endostomial segments as high as teeth»: Limpricht. — Rocks princ. in colder distr. *Eur.* not r. Sweden, Norway, Switzerl. *Amer.* r. *Can.*: Waghorne.

26. *Leskea* Hedwig.

A. Leaves nearly uniform, more or less recurved, smooth at borders at least below, more or less opaque, often faintly papillose.

1. *L. polycarpa* Ehrhart.

Leaves faintly recurved near base, gen. acute short-decurrent not much distant; those of stem ovate-oblong, those of branches subovate. Perichetial leaves long-acuminate; costa thin. Capsule subcylindric often large; teeth pale yellow, segments nearly as high; lid conic acute often apiculate. Tufts often green. — Rocks and base of trees princ. on humid places. *Eur.* common below alp. regions. Sweden, Germany, Italy! *Amer.* not r. Can.: Macoun; Drummond n. 223. U. S.: Jesup, com. Macoun. Greenl.: Wenck, com. Roell.

**L. subobtusifolia* C. M. et Kindb. cat. Canad. m.

Branch-leaves very distant and decurrent gen. obtuse. Capsule not large; lid convex apiculate. — Base of trees r. *Amer.* Can.: Macoun. U. S. Ohio: Purpus, com. Roell.

2. *L. obscura* Hedwig; Sullivant icon. muscor.

Leaves recurved gen. all around, smaller than in the last, nearly crowded and not decurrent, subovate gen. obtusate obtuse. Perichetial leaves short-acuminate; costa thick. Capsule suboblong small; teeth pale; segments short; lid conic obtuse or subobtuse. Tufts us. dirty green. Branches shorter than in the last. — Base of trees near water r. *Amer.* U. S.: Sullivant, com. C. Mueller; Austin, com. Macoun; com. Renault and Cardot.

B. Leaves very diversiform, not distinctly recurved, very papillose also at borders all around, opaque.

3. *L. (?) Cardoti* Kindb. revue bryol. 1895. — »*Leskea obscura* Hedwig»: Cardot in litt.

Leaves nearly crowded; those of stem narrowly ovate-oblong acuminate acute; those of branches broad ovate gen. subobtuse apiculate. Capsule suboblong; peristome not seen. Habit of *Anomodon*. — *Amer.* r. U. S. Louisiana: Langlois, com. J. Cardot.

27. *Lescuræa* Bryol. eur.

A. Costa of leaves not excurrent. Uppermost branch-leaves r. mamilllose above.

1. *L. striata* Schwægrichen. — *Pterogonium* Schw.; *Lescuræa* Br. eur.

Leaves oblong-lanceolate gradually acuminate recurved to the somewhat long acumen, slightly decurrent, us. entire; cells

narrowly lanceolate-linear exc. the subquadrate alar and lower marginal. Apical cells of branch-leaves linear hyaline. Capsule small oval-oblong or subcylindric; teeth orange; segments brittle; basal membrane nearly indistinct; cilia none; lid conic acute. Branches straight. Tufts us. green not glossy. Habit of *Pseudoleskea*. — Trees princ. in southern distr. r. *Eur.* France: Husnot. Italy: Bottini.

***L.saxicola** (Br. eur., as var.) Molendo.

Leaves somewhat larger, gen. shorter-acuminate and denticulate near apex, us. yellowish and glossy. Branches often curved. Resembles *Pseudoleskea decipiens*. R. fruit. — Alp. rocks. *Eur.* not r. Norway fruit.!

2.**L.imperfecta** C. M. et Kindb. cat. Canad. m.

Differs from *L. striata*: Leaves from short subovate recurved base suddenly narrowed to a long subulate or filiform acumen, distinctly decurrent; upper and middle cells oval-oblong, inner near costa oblong-linear. Capsule oblong; endostomial membrane distinct; cilia short; lid subobtus. — Earth and trees r. *Amer.* Can. Brit. Col.: Macoun.

B. Costa of some leaves long-excurrent. Upper branch-leaves often mamillöse above.

3.**L.stenophylla** Renauid et Cardot. — *Pseudoleskea* Ren. et Card.; *Lescuræa* Kindb.

Leaves narrowly ovate-lanceolate gradually long-acuminate nearly entire, recurved below; upper cells suboblong, lower inner oblong-lanceolate. Capsule suboblong erect or finally inclined; teeth brownish; segments as high (very narrow); basal membrane very low. Tufts green or yellowish. — Rocks and trees r. *Amer.* Pacif. distr. Can. alp. region: Macoun. U. S.: Roell, com. Cardot.

4.**L.frigida** Kindb. n. sp.

Leaves from subovate base nearly gradually narrowed to the long subulate or filiform-pointed acumen, recurved to it and distinctly decurrent; cells sublinear except the quadrate alar; costa sometimes long-excurrent. Stem-leaves gen. entire; branch-leaves serrulate at the whole acumen, sometimes short-acuminate and faintly mamillöse. Capsules unknown. Stem sub-pinnate. Tufts dark brown or blackish, not glossy. Very distinct in serrulate branch-leaves and very narrow leaf-cells. — *Amer.* r. Can. Northern Labrador: Macoun 1896.

28. **Myrinia** Schimper.

1.**M.pulvinata** Wahlenberg. — *Leskea* Wng; *Myrinia* Schimper; *Helicodontium* Lindb.

Leaves ovate acute not recurved, erect when dry; upper cells rhombic, lower oval-oblong, lowest basal subquadrate; costa vanishing below middle. Capsule small oval-oblong; teeth reddish; segments lower, orange, with longitudinal line and basal membrane; lid conic; pedicel short. Tufts dirty green. Branches distant not curved. Monoecious. Habit of *Leskea polycarpa* but with smaller leaves. — On base of trees, r. on rocks, princ. near rivers, r. *Eur.* Sweden 1853! Norway! *Amer.* Can.: Macoun. 2. **M. Dieckii** Renauld et Cardot.

Leaves gen. obtuse, sometimes recurved below, appressed when dry; cells rhomboidal or oval-oblong except the quadrate not well-defined alar; costa subpercurrent or somewhat shorter. Stem leaves ovate-oblong subacute; branch-leaves broad-ovate or suboval, sometimes indistinctly apiculate. Capsule (not ripe) subcylindric; lid not apiculate; pedicel short smooth. Branches distant not curved. Peristome and male flowers unknown. — Trees r. *Amer.* Pacif. distr. U. S.: Roell, com. Cardot.

29. **Helicodontium** Schwægrichen.

1. **H. subcapillatum** Hedwig. — Pterygandrum H.; Helicodontium Kindb.; Homalothecium Schimp.; Sull. ic. m.

Leaves serrulate all around or above middle, not striate, recurved to acumen, very small and not appressed; alar cells hyaline, the others rhomboidal oblong or the inner basal sublinear; costa gen. simple vanishing near or above middle, sometimes shorter and double. Stem-leaves ovate abruptly narrowed to a long filiform or subulate point, decurrent; branch-leaves ovate-oblong gen. long-subulate. Perichetial leaves narrow long-acuminate. Capsule suboblong very small; teeth red, bordered at base («sometimes also above»: Sull. l. c.) by the rudimentary endostome; lid rostellate; pedicel faintly rough, very short; calyptra sometimes beset with long hairs. Spores large. Branches erect subdistant not or faintly curved. Dioecious. — On bark r. *Amer.* U. S.: Sullivant, com. C. Mueller; Wolf, com. Macoun.

Fam. 10. **Entodontaceæ.**

30. **Holmgrenia** Lindberg (Orthothecium Schimper).

A. Tufts loose sparingly radiculose. Leaves more or less striate, reddish at insertion. Endostome not longer than teeth.

a. Leaves us. large and distinctly striate or plicate, recurved. Branches mostly long.

1. **H. chrysea** Schwægrichen. — Hypnum Schw.; Holmgrenia Lindb. 1862; Brachythecium lapponicum (Lindb.) Schimper.

Leaves ovate-oblong subobtusely or ovate-lanceolate acute or short-acuminate, abruptly contracted to a filiform point, us. suberect when dry. Capsule cylindric suberect; lid obtuse. Tufts golden glossy, r. greenish. Branches gen. simple. R. fruiting. — Wet rocks and swamps in alps r. *Eur.* princ. in northern districts. Norway! *Amer.* Can.: Macoun.

2.H.rufescens Dickson. — Hypnum D.; Holmgrenia Ldb.

Leaves ovate-lanceolate gradually long-subulate and filiform-pointed, patent also when dry. Capsule cylindric erect; lid obliquely rostellate. Tufts us. copper-glossy, sometimes green. Branches often divided. Less r. fruiting. — Wet rocks princ. in alps. *Eur.* not r., often in southern distr. Norway, Switzerl.! *Amer.* »Can.«: Lesq. et Jam.

*** H.complanata** Kindb. — Orthothecium Kindb. Laubm. Schw. u. Norw.

Leaves less patent, smaller and shorter with shorter acumen and not long filiform point, faintly striate. Branches often complanate. Capsules unknown. — Alpine rocks r. *Eur.* Norway! S. O. Lindberg and E. Nyman.

b. Leaves small, faintly or not striate, sometimes not recurved. Branches us. short.

3.H.rubella Mitten. — Stereodon Mitt.; Holmgrenia Kindb.; H. binervula Molendo.

Leaves ovate-oblong short-acuminate, abruptly contracted to a filiform point, us. recurved and faintly striate, more or less patent. Tufts copper-glossy or yellowish, r. olivaceous or green. Capsules unknown. — Rocks often in crevices and caverns princ. in alps, r. *Eur.* Norway!

*** H.stricta** Lorentz.

Leaves with shorter filiform point, less or indistinctly striate, us. not recurved, more appressed when dry. — *Eur.* r. Norway, Switzerl.! *Amer.* r. Can.: Macoun.

B. Tufts intricate radiculose. Leaves not striate, pale or yellowish at insertion. Endostome longer than teeth.

4.H.irrorata Sendtner. — Leskea Sendt. 1848; Holmgrenia Kindb.; Hypnum C. M. syn.; Leskea intricata Hartman 1849.

Leaves small ovate-lanceolate, gradually long-subulate with gen. filiform point, not recurved, patent and us. green and silky glossy when dry. Capsule oval-oblong suberect; lid conic. Stem divided; branches short often curved. Perichetial leaves denticulate above. Very r. fruiting. — Crevices and caverns of rocks princ. in alps, r. *Eur.* Norway, Switzerl.! *Amer.* Can.: Macoun.

31. **Entodon** C. Mueller (Cylindrothecium Schimper).

A. Leaves obtusate or short-acuminate, entire or near apex denticulate-sinuolate. Endostome not much lower than teeth.

a. Leaves entire with traces of several nerves near base. Stem pinnate eradiculose. Dioecious r. fruiting.

1. **E. orthocarpus** Dela Pylaie. — Hypnum Dela P.; Entodon Lindb.; Cylindrothecium concinnum (Not.) Schimp.

Leaves ovate obtuse subcucullate at apex, not large, at insertion yellow; alar cells small green. Capsule cylindric; teeth red-yellow; annulus narrow; lid not rostellate; pedicel long. Stem rigid pale; branches subdistant somewhat turgid. Tufts loose green or yellowish. Habit of *Hylocomium Schreberi*. — Dry earth and stone. *Eur.* not r. Norway! Switzerland; Schimper and Philibert (fruit. specim.). *Amer.* r. Can. N. Foundl.: Waghorne.

b. Leaves entire or near apex denticulate-sinuolate; costa double or indistinct. Stem irregularly divided or subpinnate, more or less radiculose. Monoecious often fruiting.

aa. Branches turgid julaceous. Leaves sometimes short-acuminate; costa often distinct.

2. **E. seductrix** Hedwig. — Neckera H.; Entodon C. M.; Cylindrothecium Sulliv. icon. musc.

Leaves oval-ovate acute sometimes with deflexed point, very concave but not cucullate, us. quite entire; cells often wider than in allied species, alar finally hyaline. Capsule cylindric; teeth orange distantly articulate; annulus more or less imperfect; lid rostrate; pedicel us. short. Perichetial leaves acute or short-apiculate. Tufts dense us. green. Branches crowded. — Trees and logs in moist places. *Amer.* not r. Can.: Macoun; Drummond n. 160a in part, com. Macoun. U. S.: Sullivant, com. C. Mueller; Purpus, com. Roell; com. Renauld and Cardot.

3. **E. Sullivantii** C. Mueller. — Cylindrothecium Sull. ic. m.

Leaves suboblong short-acuminate less concave, us. sinuolate or denticulate near apex; cells narrow. Capsule oblong-cylindric; teeth orange densely articulate; annulus perfect; lid rostrate; pedicel somewhat long. Perichetial leaves long-pointed. Branches less turgid and less crowded. — Trees r. *Amer.* Can.: White, com. Macoun. U. S.: Sawyer, com. Cardot.

bb. Branches compressed. Leaves us. obtusate; costa us. indistinct.

4. **E. eladorhizans** Hedwig. — Neckera H.; Entodon C. Mueller in part; Cylindrothecium Sulliv. icon. musc.

Leaves oval-ovate abruptly contracted to a short deflexed

point or obtuse, not cucullate and not distinctly denticulate; alar cells small not well-defined on a short-triangular space. Capsule subcylindric; teeth red below, pale above; annulus broad revoluble; lid acute or apiculate; pedicel about 2—3 centim. long. Branches crowded faintly compressed. Tufts dense green or brown-yellow. — Rocks and logs in woods. *Amer. Can. r.*: Macoun.

***E. transsilvanicus** Demeter in revue bryol. 1885. — *E. cladorhizans* **minutipes* Kindb. in sched.

Peristome paler. Pedicel of capsule less than 1 centim. long. — Logs *r. Eur.* near Moscow: Zickendrath. *Amer. Can.*: Macoun *Canad. m.* 263.

5.**E. Schleicheri** Br. eur. — *Cylindrothecium* Br. eur.; *Entodon Brotherus* enum. muscor. Caucas.

Differs from *E. cladorhizans*: Leaves often cucullate at apex; alar cells on a narrow-triangular space. Capsule with narrow persistent annulus; lid conic obtuse or acute. Branches less crowded and more compressed. Tufts somewhat loose sparingly radiculose us. green. — Rocks and stony earth. *Eur.* south. distr. Italy, Switzerl. France: Schimper.

6.**E. compressus** Hedwig. — Leskea H.; *Entodon* C. Mueller; *Cylindrothecium* Sulliv. icon. musc.

Differs from *E. cladorhizans*: Capsule oblong-cylindric; teeth red; lid rostrate; pedicel often short. Branches more compressed gen. distant. Tufts sparingly radiculose green or light brown. — Logs *r. Eur.* »Russia: Pallas»: Lindberg. *Amer. Can.*: Macoun. U. S.: Sullivant, com. C. Mueller; Austin, com. Macoun.

7.**E. Drummondii** Bruch et Schimper. — *Cylindrothecium* Br. et Sch.; *Entodon* Kindb.

Leaves narrowly ovate-oblong acute or short-acuminate, denticulate near apex, less crowded; alar cells large on a short-triangular space, inner basal sometimes similar. Perichetial leaves serrulate at acumen. Capsule oblong-cylindric, substrumose at base; annulus indistinct; lid rostrate; pedicel long. Branches complanate. Tufts green sparingly radiculose. — Stones and logs *r. Amer. U. S.*: Langlois, com. Cardot.

B. Leaves long-acuminate crowded; costa gen. indistinct.

a. Leaves nearly entire. Endostomial segments wanting.

8.**E. brevisetus** Hooker et Wilson. — Neckera H. W.; *Entodon* Kindb.; *Cylindrothecium* Br. et Sch.; Sull. ic. m.

Leaves from ovate-oblong base abruptly narrowed to a subulate filiform-pointed acumen; alar cells large on a narrow-

triangular or sublinear space. Capsule subcylindric; teeth pale red; annulus broad loosed in pieces or revoluble; lid obtuse; pedicel often short. Branches crowded faintly compressed. Tufts dense green or brown. Monoecious. — On prostrate trees r. *Amer. Can.*: Moser. U. S.: Sullivan, com. C. Mueller; Austin, com. Macoun.

b. Leaves denticulate nearly all around. Capsules unknown.
9. *E. acicularis* C. M. et Kindb. cat. Canad. m.

Leaves with subovate base and subulate or filiform-pointed acumen, with difficulty loosed from the stem; inner basal cells narrow, angular suboval numerous, special alar r. distinct. Branches julaceous. Tufts compact radiculose. Probably dioecious. — Rocks r. *Amer. Can.*: Macoun.

10. *E. Macounii* C. M. et Kindb. l. c.

Leaves with subovate or ovate-oblong base and subulate acumen; lower basal cells suboval nearly similar not large. Branches complanate. Tufts green sparingly radiculose. Dioecious. — Logs r. *Amer. Can.*: J. Macoun.

32. ***Platygyrium*** Bryol. eur.

1. *P. repens* Bridel. — *Pterigynandrum* Brid.; *Platygyrium* Br. eur.

Leaves recurved entire ovate-oblong or ovate-lanceolate, acuminate without filiform point; upper cells rhomboidal-oblong, middle lanceolate-linear, alar quadrate often orange on a triangular space. Perichetial leaves entire long-subulate, orange at base. Capsule oval-oblong or subcylindric; teeth orange; segments yellow linear-subulate entire, not connated at base, shorter than teeth without basal membrane; lid rostellate; pedicel gen. not long. Tufts us. glossy green. Branches short, often curved, sometimes with small branchlets for propagation. Dioecious or pseudo-monoecious. Resembles *Pylaisia* and *Hypnum perichetiale*. — On trees or r. on rocks. *Eur.* not common, r. fruiting. Sweden, Norway, Switzerl. *Amer. Can.*: Macoun. U. S.: Sullivan, com. C. Mueller.

2. *P. brachycladon* Bridel. — *Pterigynandrum* Brid.; *Platygyrium* Kindb.; Neckera C. M. syn.

Differs from the last: Endostomial segments orange linear connated at base and not shorter than teeth; lid of capsule rostrate; monoecious. Branches straight elongate. — Trees r. *Amer. Can.*: Macoun. U. S. Michigan: Purpus, com. Roell.

33. *Tripterocladium* C. Mueller in Flora 1875, as subgenus.

A. Branch-leaves denticulate nearly all around.

1. **T.leucocladulum** C. M. — Hypnum C. M. l. c.

Leaves pellucid, recurved below middle; cells small short, alar dusky numerous. Stem-leaves entire below acumen, gen. ovate-oblong long-acuminate; cells gen. narrow. Branch-leaves subovate smaller; cells gen. oval-oblong. Perichetial leaves sharply serrate. Capsule small cylindric-oval suberect; endostome without basal membrane; lid conic acute; pedicel short. Perigonial leaves entire broad-oval obtuse. Stem pinnate; branches slender julaceous. — *Amer.* Western distr. r. U. S.: Harwey, com. C. Mueller; Leiberg, com. Roell.

2. **T.compressulum** C. Mueller l. c.

Differs from the last: Leaves subovate gen. short-acuminate, those of stem faintly denticulate nearly all around. Stem irregularly divided. Capsule cernuous narrowly cylindric: C. M. — *Amer.* Pacif. distr. r. U. S.: Neeve, com. C. Mueller.

B. Leaves gen. entire, only those of branches faintly denticulate near apex. Capsules unknown.

3. **T.rupestre** Kindb. cat. Can. m. — *Platygyrium* Kindb. bull. Torr. club XVII.

Leaves gen. subovate. Stem irregularly divided. Tufts intricate. — Differs from the both last: Stem-leaves more broadly revolute to above middle; branch-leaves often obtusate acute; alar cells more numerous. — Rocks r. *Amer.* Can. Brit. Col.: Macoun.

Fam. 11. **Climaciaceæ.**

34. **Climacium** Weber et Mohr.

1. **C.dendroides** L. — Hypnum L.; *Climacium* W. M.

Stem-leaves broadly ovate-oblong apiculate entire not decurrent. Branch-leaves ovate-lanceolate obtuse with subcordate base, denticulate above middle, sharply dentate at apex; upper cells linear-lanceolate, lowest inner basal shorter and wider, alar and lower basal us. red-brown. Perichetial leaves costate. Capsule cylindric not long; teeth purplish brown; lid with not long beak. Less often fruiting. — Wet meadows and rocks r. on trees or in water. *Eur.* common! *Amer.* r. Can.: Macoun. U. S.: Henry, com. Cardot.

In a variety, floating in water, stem is irregularly divided. *Eur.* Sweden: E. Nyman.

In an other variety (forma *depauperata* Boulay?), growing on trees, the naked part of stem is nearly indistinct, leaves are densely appressed when dry, their alar cells hyaline. *Eur.* Norway near Lillehammer!

2. *C. americanum* Bridel; Sullivant icon. muscor.

Stem-leaves obtuse entire long-decurrent gen. broad-ovate; costa subpercurrent. Branch-leaves acute ovate-oblong cordate, denticulate from base, sharply serrate above middle; inner basal cells somewhat dilated. Perichetial leaves nerveless. Capsule long-cylindric; lid long-rostrate; teeth orange-red. Often fruiting.

— Logs and roots of trees. *Amer.* common princ. in Pacif. distr. Alaska: J. M. Macoun. Can.: J. Macoun. U. S.: Sullivant, com. C. Mueller; A. G. Wetherby; com. Renauld and Cardot.

In a variety (*C. americanum* var. *Kindbergii* Renauld et Cardot) leaves are shorter and broader; those of stem rotundate-ovate, those of branches ovate. — *Amer.* U. S.: com. Renauld and Cardot.

35. *Alsia* Sullivant.

1. *A. longipes* Sullivant et Lesquereux; Sulliv. icon. m.

Stem-leaves obtusate ovate-oblong denticulate above; branch-leaves ovate-lanceolate acute, obtusate or short-acuminate, serrate above, entire and recurved below; upper cells round-oval, lower suboblong; costa dentate above at back, reaching to acumen. Capsule cylindric erect; segments rimose; cilia appendiculate; lid rostrate. Branches pinnate slightly curved, not much turgid. Dioecious. — Rocks r. *Amer.* U. S.: Bolander, com. Renauld.

2. *A. circinnata* Bridel. — Hypnum Brid.; *Alsia* Kindb.; Eurhynchium Bryol. eur.

Lower stem-leaves from broad-ovate base long-acuminate, minutely denticulate; upper cells lanceolate-linear, lower oblong-lanceolate; costa vanishing in acumen. Branch-leaves small ovate-oblong acute, serrate above, denticulate and recurved below; inner cells gen. suboblong, middle suboval; costa subpercurrent dentate at back. Capsule subovate inclined or horizontal, not or slightly curved; segments split; cilia and lid as in the last. Branches turgid circinnate subpinnate. Dioecious r. fruiting. Habit of *Isothecium Breweri* and *Pterogonium*. — Earth and stone r. *Eur.* Italy: Bottini; Roell; Arcangeli. France: Henry, com. Husnot. Engl.: Curnow. Irel.: Holt.

***Scorpiurium rivale* Schimper**, differing in ovate obtusate entire leaves with suboval cells, is by Prof. Boulay regarded as a state of this species. — In water r. *Eur.* France: Boulay, com. Husnot.

36. *Isothecium* Bridel.

A. Branches not compressed.

1. **Myura**. Leaves gen. obtusate or short-pointed, not decurrent; upper cells (either on stem- or branchleaves) rhombic-oblong; costa gen. short. Branches us. curved, often julaceous. Dioecious.

2. **Myosuroidea**. Leaves gen. long-acuminate, often short-decurrent; borders not or near base recurved; upper cells lanceolate; costa us. reaching to acumen. Branches not julaceous, often curved. Dioecious not often fruiting.

3. **Stolonifera**. Leaves long-acuminate us. recurved to acumen; cells linear; costa reaching to or in acumen. Branches not julaceous, us. straight, often with numerous flagellæ (stolons). Monoecious or pseudo-monoecious often fruiting.

B. Branches compressed.

4. **Thamnioides**. Leaves small not decurrent, subdistichous gen. obtusate; upper cells suboval or rotundate. Branches r. curved. Dioecious.

1. Myura.

A. Leaves obtusate or short-acuminate.

a. Stem-leaves entire at least below middle; costa short faint.

1. **I. myurum** Pollich. — Hypnum Poll.; Isothecium Bridel.

Stem-leaves suboblong acute gen. obtusate, denticulate above; branch-leaves oblong-lanceolate short-acuminate faintly denticulate; upper cells rhombic-oblong, lower sublinear, alar rotundate on a round or short-triangular space; costa vanishing near middle. Perichetial leaves serrate above middle, subulate acuminate sometimes filiform-pointed. Capsule cylindric-oblong erect; teeth pale yellow; segments pale as high; cilia short; lid apiculate or rostellate; pedicel smooth. Branches crowded fasciculate not julaceous. Tufts loose green. Not r. fruiting. — Trees, rocks and earth in woods. *Eur.* common. Sweden, Germany, Switzerl.!

2. **I. circinnans** Schimper. — Hypnum Sch.; C. M. syn.; Isothecium Sauter; I. myurum var. robustum Schimp. syn. in part.

Differs from the last: Leaves larger and broader, oval-oblong subobtuse entire; perichetial entire with very short acumen. Stem pinnate; branches julaceous often acute. Tufts dense. — Rocks r. *Eur.* Spain, Switzerl.! France: Husnot.

3. **I. aplocladum** Mitten.

Stem-leaves from ovate-oblong base abruptly narrowed to a short subulate or filiform point, faintly denticulate above; cells sublinear also at apex; costa short but distinct. Branch-leaves oval-oblong obtusate obtuse or subacute, serrate nearly all

around; apical cells suboblong; costa vanishing near middle. Stem pinnate not radiculose; branches curved nearly crowded and subjulaceous. Tufts brown-green. »Capsule suberect oval-cylindric; lid acuminate; pedicel slightly rough»: Lesq. et Jam. — *Amer. Pacif. distr. r. Can.*: Macoun. U. S. Oregon mt Hood: Roell.

4. *I. brachycladon* Kindb. revue bryol. 1895.

Differs from the last: Leaves smaller; those of stem subovate nearly entire with very short or indistinct costa; branch-leaves sometimes short-acuminate. Stem creeping irregularly divided; branches distant very short, slightly curved and not julaceous. Tufts bright green. Capsules unknown. Habit of *I. striatulum*. — Under damp rocks r. *Amer. Can. Vanc. isl.*: Macoun 1893.

b. Stem-leaves denticulate below middle; costa thick reaching to $\frac{1}{4}$. Leaves not large.

5. *I. Breweri* Lesquereux. — *Hypnum* Lq.; *Isotheecium* Kindb.

Stem-leaves ovate acute or short-acuminate, denticulate below, serrate above; branch-leaves suboblong acute more sharply serrate; upper and middle cells rhombic or oblong-rhomboidal, lower lanceolate, alar short on a long space. Perichetial leaves abruptly contracted to a very long subulate serrate acumen. Capsule small subcylindric erect or inclined; teeth yellow higher than segments; cilia long; lid acute. Tufts dense subintricate us. brown and glossy. Stem subpinnate; branches crowded julaceous. Habit of *Pterogonium*. — Rocks r. *Amer. Pacif. distr. Can.*: Macoun. U. S.: Brewer, Henderson and Miss Mann, com. Cardot.

6. *I. myurellum* Kindb. bull. Torr. club XVII.

Differs from the last: Leaves more sharply serrate above; cells narrower, middle linear, alar disposed on a short space. Perichetial leaves nearly entire with short filiform point. Capsule suboval; lid mamillate or subapiculate. Tufts loose not glossy, often dark green. Stem pinnate; branches distant. — Trees r. *Amer. Pacif. distr. Can.*: Macoun. U. S.: Bolander, com. Cardot.

7. *I. hylocomioides* Kindb. — *I. myosuroides* subsp., Kindb. note on *Canad. bryol.* 1893.

Differs from *I. Breweri*: Leaves shorter, subovate gen. sub-obtuse, more sharply serrate above to below middle; apical cells oval-oblong, middle and lower linear, alar disposed on a short space. Perichetial leaves minutely denticulate. Capsule cylindric-oblong sometimes curved; teeth pale yellow; cilia short;

lid not seen. Tufts loose green or brown-green. Stem bipinnate; branches numerous not julaceous, often with short flagellæ. — Rocks r. *Amer.* Can. Vanc. isl.: Macoun.

B. Leaves gen. long-acuminate, ovate-oblong or ovate-lanceolate; costa thick gen. long. Stem irregularly pinnate. Leaves somewhat large.

8. *I. thamnoides* Kindb. n. sp. — »*I. aggregatum*» Kindb. cat. Can. m.

Stem-leaves denticulate below, serrate or twice serrulate above; upper cells rhombic or rhomboidal. Branch-leaves serrate nearly all around; upper cells lanceolate-linear, middle and lower sub-linear, alar disposed on a short space. Perichetial leaves serrate. Capsule cylindric inclined or slightly curved; lid short-acuminate; teeth yellow; cilia short appendiculate. Tufts loose glossy green. Branches long-attenuate nearly crowded not julaceous. — Rocks r. *Amer.* Can. Brit. Col. and Vanc. isl.: Macoun.

9. *I. aggregatum* Mitten. — Hypnum Mitt.; Isothecium Kindb.

»Lower leaves spreading broadly hastate ovate-acuminate subecostate; those on the middle of the branches broadly ovate; those near the top costate-acuminate subjulaceous imbricate serrulate toward the acute apex. Perichetial leaves ovate-lanceolate acuminate nerved to middle, serrate and reflexed at apex. Capsule cylindrical irregular inclined; lid conical acuminate; segments narrow (?); cilia solitary short. The author compares it, on account of the julaceous imbrication of the leaves, to some states of *Pterogonium gracile*, while other stems have a resemblance to *Hypnum myurum*. — *Amer.* Vanc. isl. and Brit. Col.: Lesq. et Jam. man.

10. *I. Howei* Kindb. revue bryol. 1895.

Leaves entire below middle, serrate above, often filiform-pointed; areolation as in *I. Breweri*; costa vanishing near middle. Capsule erect subcylindric. Branches crowded subjulaceous somewhat long and numerous. Tufts dirty green not glossy. — On decaying branches r. *Amer.* U. S. California: Marshall A. Howe.

2. Myosuroidea.

A. Middle and lower inner leaf-cells linear, alar finally yellowish. Branch-leaves not striate. Lid of capsule acute or short-rostrate. Stem often distinctly tree-like.

11. *I. myosuroides* L. — Hypnum L.; Isothecium Bridel; Eurhynchium Schimper.

Leaves serrulate all around, recurved only near base, subdecurrent not densely crowded; alar cells numerous finally yellow on a suboval space; costa smooth well-distinct gen. long but not reaching to acumen. Stem-leaves subovate short-acuminate often with long filiform point; branch-leaves narrowly ovate-oblong long-acuminate with short filiform point. Perichetial leaves contracted to a long serrulate subulate filiform-pointed acumen. Capsule subcylindric us. inclined; cilia short; lid short-rostrate. Stem suberect or decumbent; branches sometimes flagellate. Tufts loose us. green. — On rocks and base of trees. *Eur.* not r. Sweden, Norway, Switzerland. *Amer.* r. Can. (not in Pacif. distr.): Macoun; Waghorne.

12. *I. Holtii* Kindb. revue bryol. 1895.

Differs from the last: Leaves shorter and crowded; those of branches broad-ovate subobtusate without filiform point. Capsule suboval larger. Stem rigid; branches subulaceous. — Stones by rivers r. *Eur.* Engl. Wales: G. A. Holt 1885.

13. *I. tenuinerve* Kindb. check-list of Eur. and N. Amer. mosses. — *I. myosuroides brevinerve* Kindb. note on Can. bryol. 1893.

Differs from *I. myosuroides*: Leaves narrower with long filiform point; alar cells often finally brown on a round space. Stem-leaves nearly entire; branch-leaves ovate-lanceolate; costa us. faint vanishing far below acumen, sometimes double or indistinct. Lid of capsule conic acute not rostellate. — Rocks in woods. *Eur.* not r. Sweden! Germany: Huebner. France: Husnot m. Gall. Færoer: com. C. Jensen. *Amer.* r. Can.: Waghorne.

14. *I. aculeispis* Mitten; Lesq. et Jam. man.

»Leaves loosely imbricate; those below the perichætium cordate-ovate narrowly long-acuminate, minutely serrulate on the borders, nearly smooth at the cuspidate apex, with a very short diffused costa, forking or entire, vanishing in middle; cells of basal angles obscured or dusky; leaves of branchlets elliptical-ovate acute serrulate nerved to the middle; the perichetial subulate from an oblong ecostate base, recurved, very entire. Capsule oval inclined; pedicel short; lid conical; cilia short. — Mitten, who had seen only two stems of this moss, says that it may be *H. Brewerianum* Lesq., but that the description of that species is not sufficiently complete to be quite certain. — *Amer.* Brit. Col.: Douglas: Lesq. et Jam. l. c. (Authentic specimens not seen).

B. Leaf-cells oblong-lanceolate, lowest basal oval-quadrangle, alar green. Branch-leaves faintly striate. Lid of capsule long-rostrate. Stem decumbent; branches short.

15. *I. striatulum* Spruce. — *Hypnum* Spr.; *Isotheceium* Kindb.; *Eurhynchium* Schimp.; »*Hypnum filescens* Bridel»; C. M. syn.

Leaves serrulate all around, recurved below, subdecurrent not densely crowded; costa long stout often rough at back. Stem-leaves subovate with long subulate or filiform often twisted acumen. Branch-leaves ovate or broadly ovate-oblong, short-acuminate without filiform point. Capsule oval-oblong; cilia long. Tufts green not glossy. Resembles often *I. myosuroides* in habit. Very r. fruiting. — Rocks r. *Eur.* Switzerl. Sweden: Lindberg. France: Philibert. Italy: Arcangeli.

3. *Stolonifera*.

16. *I. stoloniferum* Hooker. — *Hypnum* Hook.; *Isotheceium* Bridel.

Leaves small ovate-lanceolate with long often filiform-pointed acumen, serrate above, entire below middle, decurrent; alar cells on a short space. Perichetial leaves long-subulate with filiform point. Capsule oval-oblong; teeth pale; cilia long; lid acute or apiculate. Tufts soft green or whitish green, faintly or silky glossy. Branches crowded; flagellæ numerous long slender. — Trees. *Amer.* Pacif. distr. not uncommon. Can.: J. Macoun. Alaska: J. M. Macoun. U. S.: Howell, com. Cardot.

17. *I. spiculiferum* Mitten.

Differs from the last: Leaves larger, serrate nearly all around, not decurrent; perichetial short-subulate. Capsule oblong; teeth pale; cilia short. Tufts less soft us. brownish and glossy. Branches shorter, less slender, often less crowded; flagellæ often wanting. — Trees. *Amer.* Pacif. distr. not uncommon. Can.: Macoun; Roell. U. S.: Roell, com. Cardot.

18. *I. Cardoti* Kindb. bull. Torr. club XVII.

Leaves larger than in the both last, shorter acuminate; those of stem faintly denticulate below with an at apex twisted acumen; cells often yellow. Perichetial leaves long-subulate. Capsule oval; teeth yellow; cilia long; lid acute. Stem often pinnate; branches not crowded; flagellæ thick r. present. More robust than the both last. Tufts us. brown. — Trees r. *Amer.* Pacif. distr. Can.: Macoun. U. S.: Roell, com. J. Cardot.

4. *Thamnioidea*.

19. *I. obtusatum* Kindb. revue bryol. 1895.

Stem-leaves broad-ovate short acuminate acute, recurved below, serrate above; branch-leaves smaller, suboval obtusate often obtuse; upper (sometimes also the middle) cells oval or broad-oblong, middle narrowly oblong or subanceolate; costa reaching

to $\frac{3}{4}$ or shorter. Capsule oblong; teeth yellowish; cilia nodose shorter; lid muticous acute. Stem pinnate; branches gen. distant, often flagelliferous. Tufts dark green. — Rocks r. *Amer. Can.* Vanc. isl.: Roell 1888, Macoun 1893.

20. I. Holzingeri Renauld et Cardot. — *Thamnium* Ren. et Card.; *Isothecium* Kindb.

Differs from the last: Leaves more obtuse, not recurved, less crowded; nearly all cells suboval or broad-oval, upper round-hexagonal. Stem-leaves oblong-lingulate obtusate gen. obtuse; branch-leaves ovate-oblong often subacute. Lid of capsule with oblique beak. — *Amer. r. U. S. Californ.*: Marshall A. Howe.

37. Pterogonium Swartz.

1. P. ornithopodioides Hudson. — *Hypnum* Huds.; *Pterogonium* Lindberg; *P. gracile* Swartz.

Leaves from broad-oval base gen. short-acuminate, more or less sharply serrate at acumen; angular cells rotundate-quadrate, inner basal elongate; middle cells oval; costa vanishing near middle. Capsule subcylindric; lid subapiculate; calyptra hairy; pedicel long. Branches thick julaceous curved when dry. R. fruiting. — Rocks and trees gen. r. *Eur.* not r. in south. distr. Switzerl. *Amer. r. U. S.*: Brewer, com. Cardot.

38. Hylocomium Bryol. eur.

A. Stem with gen. numerous paraphyllia.

a. Stem simply pinnate. Leaves somewhat large, costa sometimes simple.

I. Eu-Hylocomium. Leaves not mamilllose. Pedicel of capsule smooth.

b. Stem us. bi- or tripinnate. Leaves gen. small; costa double.

II. Pleurozium. Leaves mamilllose. Pedicel smooth.

III. Hyocomium. Leaves not mamilllose. Pedicel rough.

B. Stem simply pinnate without paraphyllia.

IV. Hypnopsis. Leaves somewhat large, sometimes mamilllose; costa often simple. Pedicel r. rough.

I. Eu-Hylocomium.

A. Stem-leaves serrate only at apex. Branch-leaves sharply serrate or fimbriate also below middle. Branches subjuiceous often turgid.

1. H. pyrenaicum Spruce. — *Hypnum* Spr.; *Hylocomium* Lindb.; *Hypnum fimbriatum* Hartman; *H. Oakesii* Sull. ic. m.; *Hylocomium* Schimp.

Leaves orange at insertion; alar cells not defined; costa often simple. Stem-leaves ovate acute sometimes short-acuminate;

branch-leaves ovate-oblong or ovate-lanceolate often long-acuminate. Capsule suboval; lid conic mamillate. Stem red; paraphyllia numerous. R. fruiting. — Earth and rocks princ. in alps gen. r. *Eur.* Norway, Switzerl.! Sweden: Hartman. *Amer.* Can.: Macoun; Waghorne.

B. Leaves denticulate or serrate all around. Branches not turgid.

a. Leaves green; costa double.

2.H.brevirostre Ehrhart. — Hypnum Ehrh.; Hylocomium Br. eur.

Stem with numerous paraphyllia. Leaves diversiform; angular cells small suboblong hyaline, the lower (special alar) brown somewhat large. Stem-leaves from very broad-cordate base abruptly tapering to a narrowly subulate acumen, brown at insertion, minutely denticulate. Branch-leaves serrate, ovate-oblong gen. gradually acuminate. Perichetial leaves pale green abruptly narrowed to the dentate us. subulate, patent or deflexed acumen, often serrate below it. Capsule oval-oblong curved; lid us. rostellate. — Earth, stone and trees. *Eur.* not r. Sweden, Germany, Switzerl.! *Amer.* r. Can.: Macoun; Moser. U. S.: A. G. Wetherby.

3.H.calvescens Wilson. — Pleurozium Kindb. rev. bryol. 1895.

Stem with few paraphyllia. Leaves uniform subdistant denticulate from cordate broad-ovate base gradually long-acuminate; angular cells large hyaline, only the lowest brown. Perichetial leaves hyaline nearly gradually narrowed to the serrate falcate filiform-pointed acumen. Capsule suboval curved; lid mamillate or subacute. Very r. fruiting. Resembles the last and *Hypnum squarrosum*, from which it differs in leaves not falcate when moist, shorter pedicel of capsule etc. — Earth in woods r. *Eur.* Sweden: Hj. Holmgren, com. M. Huss; Arnell; E. Nyman; P. Dusén. Norway: Zetterstedt. Finl.: V. F. Brotherus.

b. Leaves serrate sometimes brown-green; costa simple. Paraphyllia few.

4.H.striatum Schreber. — Hypnum Schreb.; Hylocomium Kindb. Laubm. Schw. u. Norw.; Eurhynchium Br. eur.

Leaves subdistant green very plicate when dry; alar cells few large subrectangular hyaline; costa vanishing in acumen. Stem-leaves broad-ovate obtusate; branch-leaves acuminate narrower; perichetial hyaline with dilated cells, denticulate above middle of basal part. Capsule large arcuate finally blackish; lid rostrate. Stem not decumbent; branches distant often attenuate.

Not r. fruiting. Earth and stone in woods. *Eur.* not uncommon. Sweden, Germany, France, Switzerl.!

5. **H. meridionale** Schimper. — Hypnum Sch.; Hylocomium Kindb.

Leaves crowded brown-green faintly striate; angular cells numerous oval-rectangular not large, lower dusky. All leaves long-acuminate with very broad subcordate base, often filiform-pointed, nearly spreading when moist; costa vanishing at base of acumen. Perichetial leaves yellow with very narrow cells, denticulate only at acumen. Capsule small subobovate brown; lid rostellate; pedicel much shorter than in the last. Stem decumbent; branches crowded obtuse often curved. Very r. fruiting. — On stone r. *Eur.* France: Husnot; Philibert; Berthoumieu. Italy: Bottini; Arcangeli. Spain: Dieck, com. Roell.

II. Pleurozium Sullivant.

6. **H. proliferum** L. — Hypnum L.; Hylocomium Lindberg; *H. splendens* (Hedw.) Br. eur.

Basal stem-leaves long-acuminate us. hyaline; middle (larger) stem-leaves decurrent ovate-oblong abruptly short-acuminate, serrate above middle; basal cells numerous purplish or r. orange, angular dilated subrectangular. Branch-leaves suboblong obtusate often acute, minutely denticulate above. Capsule suboblong or arcuate; lid rostrate; pedicel long. Stem proliferous by new shoots; branches large distant. — Earth in woods common. *Eur.* Sweden etc.! *Amer.*: Macoun etc.

7. **H. alaskanum** James. — Hypnum Jam.; Hylocomium Kindb.

Less robust than the last, often simply pinnate; branches us. crowded. — Stem-leaves smaller not decurrent more crowded, ovate obtuse or short-pointed, faintly serrulate above; lower basal cells reddish not numerous, angular indistinct. Branch-leaves subovate or suboblong gen. obtuse nearly entire. Capsules unknown. — On earth in open heaths princ. in alps. *Eur.* Norway! Sweden (below alps)! Spetsbergen: R. Gyllencreutz. Switzerl.: Culmann, com. Husnot. *Amer.* Alaska: J. M. Macoun; Dall, herb. James, com. C. Mueller. Can.: Macoun; Waghorne.

III. Hycomium Br. eur. in part.

8. **H. umbratum** Ehrhart. — Hypnum Ehrh.; Hylocomium Br. eur.

Leaves sharply fimbriate, at least those of branches; lower basal cells dilated. Stem-leaves ovate-oblong short-acuminate; branch-leaves oblong-lanceolate. Capsule oval-oblong; lid conic

apiculate; pedicel faintly rough. Not often fruiting. — Stones, logs and earth in woods. *Eur.* not r. Norway, Switzer.! *Amer.* r. Can.: Macoun; Waghorne.

9. *H. flagellare* Dickson. — Hypnum Dicks.; Hylocomium Kindb. Laubm. S. u. N.

Leaves sharply serrate all around; angular cells dilated oval-oblong very numerous. Stem-leaves from short base long-acuminate, sometimes filiform-pointed; branch-leaves shorter-acuminate. Capsule oblong; lid apiculate. R. fruiting. — Wet rocks near running water r. *Eur.* Spain! Engl.: Holt.

IV. Hypnopsis Kindb.

A. Pedicel of capsule smooth. Costa of leaves us. double.

a. Leaves denticulate mamillöse very large, squarrose.

10. *H. triquetrum* L. — Hypnum L.; Hylocomium Sch.

Leaves densely crowded, often striate; nerves us. two. Stem-leaves ovate-cordate acute sometimes short-acuminate; branch-leaves longer-acuminate; angular cells dilated subrectangular hyaline. Capsule arcuate, striate when dry; teeth purplish; cilia long; lid acute or apiculate. Stem erect. Earth in woods, gen. common. — *Eur.*! *Amer.*: Macoun etc.

b. Leaves not mamillöse, appressed when dry; those of stem entire or indistinctly denticulate.

11. *H. Schreberi* Willdenow. — Hypnum W.; Hylocomium Kindb.; Hylocomium parietinum Lindberg.

Stem red; branches gen. not turgid. Leaves not or faintly striate; upper cells lanceolate, middle sublinear, lower inner oblong-lanceolate often yellow; angular cells suboval red-yellow, special alar not well-defined; costa short double. Stem-leaves broad-ovate entire obtuse or apiculate; branch-leaves oblong subacute denticulate at apex. Capsule suboblong arcuate; teeth pale; segments open in middle; lid acute; pedicel long or short. Not r. fruiting. — Earth in woods and heaths common. *Eur.*! *Amer.* Macoun etc.

12. *H. purum* L. — Hypnum L.; Hylocomium Notaris.

Stem pale or yellowish; branches turgid. Leaves striate us. green; cells green, lowest basal large suboval, alar not much larger, the others gen. linear; costa short double or simple reaching above middle. Stem-leaves round-oval abruptly narrowed to a short subulate point, nearly entire; branch-leaves suboblong subacute denticulate all around. Capsule suboblong arcuate; teeth yellow; segments split in middle; lid rostellate; pedicel us. long. R. fruiting. — Earth in woods and heaths.

Eur. not uncommon. Sweden, Germany, Switzerl.! *Amer.* »Miquelon isl.»: Cardot.

B. Pedicel of capsule rough. Costa of leaves simple.

13. **H. megaptilum** Sullivant. — *Camptothecium* Sull. icon. musc.; *Hylocomium* Kindb.

Stem pale, branches thick not distinctly turgid. Leaves plicate shining not decurrent, green or finally yellowish, larger than in the last; costa dentate at back vanishing near or above middle. Stem-leaves entire broadly ovate-oblong abruptly narrowed to a somewhat long subulate filiform-pointed acumen; alar cells few small suboval, the others linear. Branch-leaves denticulate above middle, serrate in upper part, gen. ovate-oblong, obtusate with short broad subacute point; apical cells lanceolate-oblong, the others linear exc. the alar. Perichetial leaves long-subulate. Capsule large oval-oblong or arcuate; teeth yellow; segments entire; cilia long appendiculate; pedicel often long. Often pseudo-monoecious. — On ground in woods r. *Amer.* U. S. princ. in Pacif. distr.: Hall and Howell, com. Macoun; Leiberger, com. Mrs Britton.

39. **Girgensohnia** (Lindberg, as subgenus) Kindb.

1. **G. ruthenica** Weinmann. — *Hypnum* Weinm.; *Climacium* Lindb.; Sulliv. icon. m.

Lower stem-leaves squamiform hyaline entire. Other stem-leaves broad round-ovate obtuse short-pointed; branch-leaves broadly ovate-lanceolate subobtuse long-decurrent, denticulate below middle, sharply serrate above; upper cells lanceolate-oblong, lower inner sublinear; costa dentate at back not percurrent. Capsule oblong-cylindric; lid conic acute or apiculate; pedicel not long. — *Amer.* r. Alaska: J. M. Macoun.

40. **Thamnium** Bryol. eur.

A. Leaves sharply serrate above, gen. large; costa dentate above or smooth, not percurrent.

a. Stem-leaves broad subovate. Lid of capsule rostrate; cilia of endostome long appendiculate.

1. **Talopecurum** L. — *Hypnum* L.; *Thamnium* Br. eur.

Branches more or less compressed sometimes flagelliferous. Middle stem-leaves ovate subobtuse or acute not fimbriate; branch-leaves narrow-oblong acuminate acute; middle cells oval-oblong, inner basal sublinear; costa dentate subpercurrent. Capsule suboblong; pedicel nearly straight us. prolonged. Dioecious not often fruiting. — Shaded often damp rocks. *Eur.* not r. Sweden, Switzerl.!

2. *T. Leibergii* Britton.

Differs from the last: Leaves broader, those of branches broadly oval-oblong less acuminate; cells larger, middle oval, lower oblong-linear; costa shorter. Capsule suboval; pedicel somewhat short. — Damp rocks r. *Amer.* Can.: Macoun. U. S.: Roell; Leiberg, com. Mrs Britton.

3. *T. alleghaniense* C. Mueller. — Hypnum C. M.; Sulliv. icon. m.; Thamnum Schimper.

Branches turgid. Middle stem-leaves ovate obtuse often fimbriate above; branchleaves suboval obtusate subacute very concave; cells not much larger than in *T. alopecurum*, middle oval, inner basal oblong-linear; costa thick nearly smooth not much long. Capsule suboblong; pedicel curved not long. Sometimes synoecious or monoecious. — Damp rocks and shaded banks. *Amer.* not r. Can. r.: Macoun. U. S.: Austin, com. Macoun.

b. Stem-leaves broadly ovate-lanceolate. Capsules unknown.

4. *T. Toccoæ* Sullivant et Lesquereux. — Anomodon S. et Lq.; Sull. icon. musc.; Thamnum Kindb.

Branches turgid often curved. Leaves sharply serrate or fimbriate above; cells very small nearly all uniform seriate; costa smooth subpercurrent. Stem-leaves acute with short acumen or point, faintly recurved below; inner cells suboval, few apical sometimes sublinear. Branch-leaves smaller narrower longer-acuminate more distinctly recurved. Perichetial leaves narrow filiform-pointed costate. — Rocks r. *Amer.* U. S. Georgia: Lesquereux, com. Renauld; Small, com. Roell.

c. Leaves narrow, those of stem lanceolate-linear, those of branches sublanceolate. Capsules unknown.

5. *T. angustifolium* Holt.

Middle stem-leaves acuminate serrate; middle and lower cells suboval; costa thick very broad below. Branches more slender than in *T. alopecurum*. — Wet rocks r. *Eur.* Engl.; G. A. Holt.

B. Leaves small narrow sharply serrate all around; costa dentate at back in its whole length, percurrent or subexcurrent. Capsules unknown.

6. *T. micro-alopecurum* Kindb. rev. bryol. 1895.

Leaves suboblong decurrent: cells nearly uniform round-rhombic or subquadrate; costa narrow. Stem low; branches turgid. — *Amer.* r. U. S. Oregon: J. A. Hertzman, com. E. Nyman 1886.

Fam. 12. **Thuidiaceæ.**

41. **Myurella** Bryol. eur.

A. Leaves densely crowded not acuminate, soon becoming whitish green. Perichetial leaves subulate-acuminate r. with filiform point. Capsule with very short or indistinct neck.

1. **M. julacea** Villars. — Hypnum Vill.; Myurella Br. eur.

Leaves round-ovate obtuse faintly denticulate us. not strongly papillose, r. with short filiform point. Capsule suboblong; cilia short; lid conic. Tufts sparingly, gen. only at base, radiculose. R. fruiting. — On rocks or on base of trees. *Eur.* not r. Sweden, Norway, Switzerl. *Amer.* r. Can.: Macoun.

* **M. gracillima** Kindb. n. subsp. — *M. julacea* var. *gracilis* Kindb. Laubm. Schwed. u. Norw.

Leaves, at least the upper, acute with filiform point, smaller than in our other species. Tufts compact densely radiculose also above. Capsules unknown. — Alp. rocks r. *Eur.* Norway near Kongsvold!

B. Leaves distant acuminate filiform-pointed; perichetial also with filiform point. Capsule distinctly necked. R. fruiting.

2. **M. tenerrima** Bridel. — Pterigynandrum Brid. 1819; Myurella Lindb.; *M. apiculata* (Hueb.) Br. eur.

Leaves slightly papillose faintly denticulate not much distant, subovate nearly gradually acuminate. Capsule obovate; cilia long; lid conic. — Alp. rocks r. *Eur.* Norway! *Amer.*: Berggren; Lesq. et Jam.

3. **M. gracilis** Weinmann. — Hypnum Wm. 1845; Myurella Lindb.; *M. Careyana* Sulliv. ic. m.

Leaves very papillose coarsely dentate or fimbriate gen. much distant, broad-ovate abruptly acuminate. Capsule thick piriform; cilia sometimes short; lid obtuse. — Limestone rocks. *Eur.* r. Austria; Breidler, com. Warnstorf. *Amer.* less r. Can.: Macoun; Moser; Wagborne.

42. **Heterocladium** Bryol. eur.

A. Leaves distinctly dimorphous. Stem with paraphyllia.

a. Leaves smooth, r. mamilllose at apex.

1. **H. procurrens** Mitten. — Pterogonium Mitt.; Heterocladium Kindb.; Macoun Canad. musci n. 498; Hypnum, subg. Heterocladium, Lesq. et Jam.; Heterocladium aberrans Ren. et Card.

Leaves denticulate all around, not distinctly recurved, distant, spreading when dry; costa double. Stem-leaves from ovate base gradually tapering to a long filiform or subulate point,

decurrent; alar cells suboval, apical and inner basal sublinear, the others oval-oblong. Branch-leaves ovate mostly obtusate sometimes short-acuminate or apiculate; cells suboval except the inner basal. Outer perichetial leaves suboblong with long narrow falcate acumen; inner much narrower, gradually subulate and nerveless with linear cells. Capsule inclined oval not curved (in Canadian specimens), sometimes (according to figures by Renauld and Cardot) suboblong oblique or faintly curved; teeth yellow; segments rimose; cilia short nodose; lid high convex with short point; pedicel smooth 1.5—3 centim. long. Stem pinnate. Tufts green very loose. Dioecious. — On wet rocks and base of trees in alp. regions; *Amer.* Western slope r. Can.: Macoun. U. S.: Roell, com. Cardot.

b. Leaves papillose; apical cells (at least on stem-leaves) narrow, also the inner basal.

2. **H. squarrosulum** Voit. — Hypnum Voit; Heterocladium Lindb.; Hypnum dimorphum Brid.; Heterocladium Br. eur.

Leaves denticulate all around, not recurved, pellucid; inner cells gen. rotundate; costa us. double. Stem-leaves from round-ovate decurrent base gen. long-acuminate, r. obtuse, us. spreading when dry. Branch-leaves broad-ovate obtusate or short-acuminate, often appressed when dry. Outer perichetial leaves nerveless with falcate acumen. Capsule inclined subovate or arcuate; teeth yellow; segments rimose; cilia long; lid subconic. Stem often subpinnate; branches obtuse. Dioecious r. fruiting. — Earth and rocks. *Eur.* not r. Sweden, Norway, Switzerl.! *Amer.* eastern distr. r. Can.: Moser; Waghorne.

3. **H. Austini** Sullivant. — Leskea Sull. ic. musc.; Heterocladium Kindb.

Leaves entire, slightly recurved below, ovate at base, not spreading when dry; costa simple faint sometimes prolonged to acumen. Stem-leaves short-acuminate; branch-leaves with longer, subulate acumen. Perichetial leaves with subfiliform point, inner erect. Capsule suboblong erect; lid obtuse; endostome unknown. Stem not pinnate. Monoecious. — Trees and stone-walls r. *Amer.* U. S.: Austin, com. Macoun. — The figures by Sullivant not are exactly agreeing with typical specimens.

B. Leaves uniform papillose denticulate not recurved, not spreading when dry; upper cells short wide, alar not defined; costa not reaching above middle. Capsules unknown. Stem irregularly divided without paraphyllia. Dioecious.

4. **H. triste** Cesati. — Leskea Ces.; Heterocladium Kindb.; Anomodon Sullivant.

Leaves brittle from subovate base contracted to a sublinear obtuse acumen, denticulate all around, distant but not decurrent; cells round-hexagonal except some oblong near the simple costa. Tufts loose blackish green when dry. — Rocks and trees r. *Eur.* Italy, Switzerl. *Amer.* U. S.: Austin, com. Macoun; James, com. Boswell.

5. **H. frullaniopsis** C. M. et Kindb. cat. Canad. m.

Leaves not brittle, round-oval obtusate cochleariform, minutely denticulate above middle, decurrent; upper cells rhombic, lower oblong; costa more or less distinct, sometimes stout and simple. Tufts dark green. — Trees r. *Amer.* Can. N. Brunsw.: Moser, com. Macoun.

43. **Pseudoleskeella** Kindb., new genus.

A. Leaves distinctly denticulate.

a. Leaves dimorphic; those of stem acuminate acute.

1. **P. heteroptera** Bruch. — Pterogonium Bruch; Heterocladium Br. eur.

Leaves opaque very papillose, ovate-oblong serrulate all around, slightly recurved near base; cells gen. rotundate-quadrate. Stem-leaves gen. longer-acuminate; inner basal cells elongate; costa pellucid us. double. Branch-leaves subsizant often obtuse. Capsule small suboval sometimes erect; teet pale, segments rimose as high; cilia long; lid obliquely rostrate; pedicel short. Stem r. subpinnate; branches attenuate or acute, fasciculate or distant, often flagellate. Dioecious very r. fruiting. — Rocks r. *Eur.* Sweden, Switzerl. *Amer.* Pacif. distr. Can.: Macoun; Drummond n. 219. U. S.: Roell, com. Cardot.

2. **P. vancouveriensis** Kindb.; Thuidium bull. Torr. club XVII; Heterocladium cat. Canad. m.

Differs from the last: Leaves pellucid faintly papillose, below middle entire and often recurved; cells larger gen. more rotundate or suboval; costa of stem-leaves simple opaque. Capsule sometimes horizontal; lid conic acuminate. Stem subpinnate; branches short r. flagellate. Monoecious. — Rocks r. *Amer.* Pacif. distr. Can.: Macoun. U. S.: Roell, com. Cardot.

3. **P. denticulata** Sullivant. — Leskea Sull. ic. m.; Hypnum fabroniaefolium C. M. syn.

Leaves pellucid faintly papillose minutely denticulate nearly all around; alar cells quadrate sometimes dilated, marginal rhombic, the others gen. suboblong; costa double very short or indistinct. Stem-leaves from round-ovate base abruptly long-acuminate; branch-leaves subovate short-acuminate concave

faintly recurved below at one side. Capsule suboval suberect; teeth yellow scarcely higher than the rimose segments; cilia rudimentary or wanting; lid rostrate or rostellate; pedicel short. Tufts bright green. Branches somewhat compressed. Dioecious r. fruiting. — Base of trees r. *Amer.* U. S. middle and south. states: Austin, com. Macoun.

b. Leaves nearly uniform.

4. ***P. occidentalis*** Sullivant. — Hypnum Sull. icon. m.

Leaves pellucid nearly smooth obtusate obtuse subovate or ovate-oblong, denticulate above, faintly recurved at base; alar cells small quadrate, inner basal lanceolate, the others gen. rhombic-oval; costa often indistinct sometimes reaching to middle. Capsule suboval straight suberect or inclined oblong slightly curved; segments entire as high as teeth; cilia nodose shorter; lid conic rostellate; pedicel not long. Tufts green silky glossy. Stem irregularly branching or subbipinnate. Habit of *Pterygynandrum* in sterile state. — Base of trees r. *Amer.* Pacif. distr. Can.: Macoun. »U. S.: Hall»; Sullivant. — Not described in Lesq. et Jam. man.

5. ***P. homalostegia*** C. Mueller. — Hypnum C. M. in Flora 1873.

»Leaves faintly papillose obsoletely denticulate not recurved, from cordate base broad-ovate short-acuminate, suberect when moist; alar cells quadrate, the others narrowly elliptic; costa short double. Capsule subcylindric asymmetric horizontal; teeth red; segments yellow; cilia short; lid nearly flat with short point; pedicel not long. Tufts dusky green. Branches julaceous; stem creeping. Monoecious. — Bark of trees r. *Amer.* U. S. Alabama: Mohr»; C. M.

B. Leaves entire or at acumen indistinctly sinuolate, pellucid faintly papillose. Dioecious.

a. Leaves quite entire; cells rotundate exc. the alar.

6. ***P. catenulata*** Bridel. — Hypnum Brid.; Pseudoleskea Br. eur.

Leaves ovate or ovate-oblong acute or subobtuse sometimes short-acuminate, faintly recurved near base, crowded; costa vanishing near middle or shorter. Perichetial leaves suboblong acuminate costate. Capsule oblong arcuate; teeth yellow; segments rimose nearly as high; cilia shorter not appendiculate; lid rostellate. Tufts us. brownish or ferruginous. Stem creeping irregularly pinnate, us. rigid when dry. R. fruiting. — On rocks or r. at base of trees. *Eur.* not r. Switzerl. fruiting, Sweden, Norway!

* ***P. laxifolia*** Kindberg. — Pseudoleskea catenulata **laxifolia* Kindb. revue bryol. 1892.

Leaves larger, green broad ovate recurved to middle, somewhat distant; costa stronger. Capsules unknown. — Rocks r. *Eur. Switzerl.*

7. **P. malacoclada** C. M. et Kindb. — *Pseudoleskea* cat. Can. m.

Leaves subulate-acuminate recurved near base; costa very short or indistinct. Stem-leaves from broad round ovate base abruptly narrowed; branch-leaves more gradually tapering. Perichetial leaves nerveless with patent or curved acumen. Capsules unknown. Stem sparingly radiculose not rigid. Tufts green or finally fuscous. Habit of the last. — Dry rocks r. *Amer. Can. Brit. Col.: Macoun.*

8. **P. Wollei** Austin. — *Leskea* Aust.; *L. cyrtophylla* Kindb. cat. Can. m.

Leaves from broadly round-ovate base short-acuminate, recurved below; costa indistinct. Tufts dark-green or brown, nearly eradulose. Capsules unknown. — Rocks r. *Amer. Can.: Macoun.*

b. Leaves often sinuolate above; cells more or less elongate. 9. **P. papillosa** Lindberg. — *Leskea* or *Heterocladium* Lindb.; *Pseudoleskea* Schimper.

Leaves very small broad-ovate gen. short-acuminate; costa sometimes forked; inner basal cells of stem-leaves elongate, the others gen. oval. Tufts dark green. Branches not flagellate. Capsules and flowers unknown. — Rocks r. *Eur. Norway! Finl.: R. Hult. Sweden: E. Nyman.*

44. **Pseudoleskea** Bryol. eur. in part.

I. **Eu-Pseudoleskea**. Leaf-cells gen. dilated, more or less papillose. Endostomial segments not split.

II. **Ptychodium**. Leaf-cells narrow, us. smooth or faintly papillose. Endostomial segments not split.

1. **Eu-Pseudoleskea**.

A. Peristome orangé or yellow. Terminal branch-leaves strongly papillose.

a. Leaves not squarrose, gen. crowded.

1. **P. atrovirens** Dickson. — *Hypnum* Dicks.; *Pseudoleskea* Br. eur.

Leaves from ovate-oblong base narrowed to a subulate serrulate gen. long acumen; inner cells us. rhombic-oval. Terminal branch-leaves with suboval apical cells. Perichetial leaves smooth subulate-acuminate nearly entire; costa short faint. Capsule oval-oblong gen. asymmetric; segments nearly as high as teeth, often split; cilia rudimentary or wanting; lid conic acute. Tufts not densely radiculose, us. brown with green branch-tops. Branches us. subpinnate with numerous branchlets. — Rocks

princ. in alps. *Eur.* not r. *Switzerl.*! *Amer.* N. Foundl.: Waghorne. »Greenl.»: Lange.

* *P.flamentosa* Dickson. — Hypnum D.; Pseudoleskea Boulay.

Tufts us. green. Leaves less papillose; inner cells narrower. — Rocks. *Eur.* Norway, *Switzerl.*! *Italy*: Arcangeli.

* *P.tenella* Kindb. n. subsp.

Leaves smaller entire very papillose; cells rotundate. Capsules unknown. — *Amer.* r. Canada: Waghorne.

2. *P.ticinensis* Bottini. — »*P. patens*»: Limpricht.

Differs from *P. atrovirens*: Branches irregularly divided; terminal branch-leaves longer-acuminate, strongly papillose nearly all around. Capsule arcuate. — Alps r. *Eur.* *Switzerl.*: Bottini; Mari.

3. *P.brachyclados* Schwægrichen. — Leskea Schw.; Pseudoleskea Kindb.

Leaves ovate or ovate-oblong with short sublinear in upper part serrulate acumen; cells rhombic-oval or subquadrate. Perichetial leaves papillose subulate-acuminate denticulate; costa strong subpercurrent. Capsule obovate subsymmetric; segments split, nearly as high as teeth; cilia sometimes long and appendiculate; lid short obtuse. Tufts and branches as in *atrovirens*. R. fruiting. — Alp. rocks. *Eur.* not r. Norway, *Switzerl.*! Spain monte Maladetta! Austria: Venturi. France: Husnot.

* *P.borealis* Kindb. n. subsp.

Stem-leaves subovate broader; terminal branch-leaves more strongly papillose. Stem very radiculose. Capsules not found. — Rocks r. *Eur.* in northern districts also below alps. Norway! Sweden in Wermland: Miss O. Cron.

4. *P.patens* Lindberg. — Lesquereuxia Lindb.; Pseudoleskea Kindb. check-list of Eur. and N. Amer. mosses 1894; Limpricht 1895.

Differs from *P. brachyclados*: Leaves entire; costa shorter us. vanishing below acumen. Branches sparingly irregularly divided. Capsules unknown. — Rocks r. *Eur.* below alp. districts. Sweden: O. Nordstedt etc.

b. Leaves loosely disposed horizontally squarrose when moist.

5. *P.heterocladioides* Kindb. rev. bryol. 1895.

Leaves as in *P. atrovirens* but gen. entire, only those of branches slightly serrulate above. Perichetial leaves entire filiform-pointed nearly nerveless. Capsule asymmetric subobovate; segments rimose not split; cilia nodose; lid rostellate. Stem as in *P. atrovirens*. Tufts bright green. — Rocks r. *Eur.* Norway near Trondhjem: I. Hagen. — »*P. patens*» Limpricht.

B. Peristome pale. Leaves faintly papillose.

6. *P. falcicuspis* C. M. et Kindb. cat. Canad. m.

Leaves broadly ovate-lanceolate nearly entire, more or less acuminate; cells oval-oblong. Perichetial leaves abruptly narrowed to a somewhat short (subulate or subfiliform) often falcate acumen, entire and faintly papillose; costa faint. Capsule obovate subsymmetric; endostomial segments lower than teeth; pedicel short; cilia and lid not seen. Tufts sparingly radiculose green or olivaceous. Branches subulaceous subpinnate; branchlets numerous. Corresponding to *P. brachyclados*. — Rocks in alp. region r. Amer. Pacif. distr. Can.: Macoun. U. S.: Roell.

7. *P. oligoclada* Kindb. bull. Tor. club XVII, 1890.

Leaves from broad-ovate base abruptly narrowed to a longer subulate nearly entire acumen, densely crowded not decurrent; uppermost cells narrow, the others round-quadrate very small with incrassate walls and not confluent. Perichetial leaves longer-acuminate. Tufts sparingly radiculose dark brown. Branches irregularly divided; branchlets few distant. Capsules unknown. — Rocks r. Amer. Pacif. distr. Can.: Macoun; Roell, com. Cardot.

II. *Ptychodium* Schimper in part.

A. Leaves somewhat large, often (also when dry) distinctly falcate, gen. smooth; costa not excurrent. Stem-leaves gen. entire. Habit of *Hypnum* (Cupressina) or *Brachythecium*.

8. *P. plicata* Schleicher. — *Hypnum* Schl.; *Pseudoleskea* Kindb.; *Lesquereuxia* Lindb.; *Ptychodium* Schimper.

Leaves large not or slightly decurrent, from ovate-oblong or ovate-lanceolate base long-acuminate subulate; upper cells linear, middle lanceolate or oblong-lanceolate. Branch-leaves us. denticulate near apex. Perichetial leaves acuminate often costate, inner with subulate acumen. Capsule suboblong us. finally arcuate; peristome orange or yellow; segments not lower, us. not rimose, their basal membrane nearly half as high; cilia rudimentary; lid short-conic obtuse or acute; pedicel 1—2 c. m. long. Tufts loose nearly eradiculose, brown at least below. Stems much ramose often subpinnate. R. fruiting. — On rocks or on ground in alp. woods gen. r. Eur. Switzerl. not r. Sweden: Lindberg.

* *P. rhætica* Kindb. n. subsp.

Leaves entire shorter and somewhat smaller, from subovate base less gradually attenuate and shorter acuminate, more appressed when dry. Outer perichetial leaves abruptly acuminate with short or indistinct costa, inner nerveless obtusate

obtuse or short-pointed. Capsule erect symmetric; segments rimose. Tufts brown gen. eradiculose. — Alp. rocks r. *Eur.* Switzerl. near Churwalden in Graubunden 1888!

9. ***P. affinis*** Limpricht. — *Ptychodium* Lpr.; *Pseudoleskea* Kindb.

Differs from *P. plicata*: »Leaves long-decurrent narrower and narrowly reflexed, those of branches costate to middle. Paraphyllia few. Capsules unknown. — Alp. rocks r. *Eur.* Austria: Breidler»: Limpricht.

10. ***P. hyperborea*** C. Mueller. — *Ptychodium* C. M. in litt.; *Pseudoleskea* Kindb.

Differs from *P. plicata*: Leaves shorter and broader, all entire; those of stem ovate short-acuminate, those of branches from ovate base long-acuminate or ovate-lanceolate. Branches simple julaceous. Capsules not seen. — Arctic district r. *Eur.* Norway near Nord-Cap 1892: W. Baur, com. C. Mueller.

11. ***P. sciuroides*** Kindb. bull. Tor. club XVII.

Leaves from ovate base narrowed to a shorter (subulate or filiform) nearly entire acumen, not decurrent; cells hyaline, only at insertion yellow, upper lanceolate, middle oblong-lanceolate. Perichetial leaves more attenuate to the subdenticulate acumen; costa none or indistinct. Capsule oblong suberect or inclined; peristome orange; teeth hyaline-bordered without distinct longitudinal line; segments scarcely lower; their basal membrane very low; cilia not appendiculate; pedicel 1,5 c. m. long; lid not seen. Tufts loose sparingly radiculose pale green. Branches few curved irregularly divided. — Rocks r. *Amer.* Can. Rocky mts: Macoun.

* ***P. denudata*** Kindb. (cat. Can. m. as var.) n. subsp.

Stems very long about 10 c. m., nearly simple, naked below without rhizoids. Capsules unknown. — Rocks in higher alp. region r. *Amer.* Can. Brit. Col.: Macoun.

B. Leaves not large, nearly appressed when dry, not or slightly curved, us. denticulate at acumen. Habit of *Lescuræa*.

a. Leaves distinctly papillose; costa sometimes excurrent.

12. ***P. rigescens*** Wilson. — *Leskea* Wils.; *Pseudoleskea* Lindb.; *Hypnum radicosum* Lesq. et Jam.

Leaves ovate-lanceolate or from broad base long-acuminate, often long-decurrent; upper cells sublinear, middle suboblong; costa not excurrent. Perichetial leaves abruptly filiform-pointed smooth nearly entire; costa short faint. Capsule narrowly oblong curved; peristome pale or pale yellow; cilia none; lid short obtuse; pedicel 1—2 c. m. long. Tufts green very

radiculose. Branches subpinnate, branchlets numerous. — Trees and rocks. *Amer.* princ. in alp. regions of Pacif. distr., there corresponding to *P. atrovirens*. Alaska: J. M. Macoun. Can.: J. Macoun; Drummond n. 225. U. S.: Roell, com. Cardot.

13. *P. bicolor* Kindberg n. sp. (*Lescurea*?).

Differs from the last: Leaves longer-acuminate, their middle cells sublanceolate. Costa of stem-leaves long-excurrent. Capsules unknown. Tufts sparingly radiculose, dark brown with green branch-tops. Stem irregularly divided. — Schistose alp. rocks r. *Eur.* Sweden in Lapland near lake Virijaur: E. Nyman 1893.

14. *P. atricha* Kindb. note on Can. bryol. 1893.

Leaves ovate-oblong short-acuminate; cells sublanceolate conflated irregularly sinuous; costa not excurrent. Capsules unknown. Tufts brownish or olivaceous with green branch-tops, loosely cohering without rhizoids. Branches subulaceous irregularly divided; paraphyllia very few. — Rocks in higher alp. region r. *Amer.* Can. Pacif. distr.: Macoun.

b. Leaves gen. smooth and long-acuminate; costa not excurrent. Capsule gen. symmetric suberect; peristome golden yellow.

aa. Stem much divided. Endostomial segments broad rimose.

15. *P. decipiens* Limpricht. — *Ptychodium* Limpr.; *Pseudoleskea* Kindb.

Leaves gen. denticulate above; upper cells linear, middle lanceolate-oblong; costa vanishing below acumen. Stem-leaves from subovate-oblong base abruptly tapering; branch-leaves more gradually attenuate. Tufts green or yellowish. Branches us. not curved. »Inner perichetial leaves gradually acuminate, denticulate nearly all around; costa short faint. Capsule sub-oval»: Limpricht. Confounded with *Lescurea striata* »*saxicola*, princ. differing in endostome and narrower leaf-cells. — Stone in alp. region r. *Eur.* Norway, Switzerl.!

16. *P. Pfundtneri* Limpr. — *Ptychodium* Lpr., *Pseudoleskea* Kindb.

»Leaves gradually acuminate gen. entire; upper cells sublinear, the others rhomboidal or rhombic-hexagonal; costa subpercurrent. Stem-leaves from ovate-oblong base long-subulate; branch-leaves lanceolate. Perichetial leaves abruptly long-subulate; costa indistinct. Capsule broad-oval strangulate; pedicel 5—7 m. m. long. Tufts pale or yellowish green. — Stone in higher alp. region r. *Eur.* Austria, Germ., Switzerl.»: Limpricht.

bb. Stem nearly simple denudate below. Capsules unknown.

17. **P. Breidlerii** Kindb. (new name). — *Ptychodium oligocladum* Limpricht 1895.

»Leaves from ovate base suddenly long-subulate gen. entire, pale or bright green; cells gen. sublanceolate; costa vanishing below acumen. — Rocks in higher alp. region r. — *Eur.* Salzburg: Breidler»; Limpricht.

45. **Thuidium** Bryol. eur.

A. Leaves crisped when dry, not recurved, more or less distant; cells gen. rotundate. Stem us. creeping; paraphyllia wanting. Pedicel of capsule short, sometimes rough.

I. Claopodium. Leaves denticulate; those of branches narrowly acuminate; cells round-oval or suboblong. Dioecious.

II. Pseudo-Claopodium. Leaves us. entire, broadly short-acuminate or obtusate, very small; those of branches us. obtuse; cells rotundate. Us. monoecious.

B. Leaves not (exc. *T. minutulum*) crisped, gen. appressed when dry, often recurved, us. crowded; cells sometimes elongate. Stem often not creeping; paraphyllia us. numerous. Pedicel smooth.

a. Leaves small. Tufts intricate. Stem us. creeping; paraphyllia short. Capsule small; pedicel us. not much long.

III. Micro-Thuidium. Leaves us. faintly papillose; cells gen. rotundate. Stem sometimes irregularly pinnate. Us. monoecious.

b. Stem-leaves gen. large. Tufts loose not intricate. Stem r. creeping; paraphyllia us. long. Capsule large; pedicel very long.

IV. Eu-Thuidium. Leaves us. very papillose; inner basal cells sublinear or oblong, the others gen. rotundate. Stem bi- or tri-pinnate; paraphyllia long. Dioecious r. fruiting.

V. Elodium. Leaves often faintly papillose or mamilllose, sometimes smooth; cells often elongate, the middle gen. suboblong. Stem simply pinnate, not creeping; paraphyllia sometimes short. Monoecious or dioecious.

I. Claopodium Sullivant.

A. Leaves of stem and branches with long hyaline hairpoint. Stem often without rhizoids, pinnate or with pinnate branches.

1. T. crispifolium Hooker. — *Hypnum* Hook.; *Thuidium* Kindb.; *Hypnum ramulosum* Hampe.

Stem-leaves ovate-lanceolate or from short round-ovate base abruptly subulate; branch-leaves narrower; cells round-oval.

Perichetial leaves costate hyaline, pale yellow at base. Capsule suboval; teeth orange; segments split; cilia appendiculate; lid short-beaked; pedicel rough. — Rocks also in alp. region. *Amer.* Pacif. distr. Alaska: J. M. Macoun. Can.: J. Macoun.

B. Leaves, at least those of branches, without distinct hair-point. Stem creeping subpinnate or bipinnate.

2. **T. leuconeuron** Sulliv. et Lesquer.; Sull. icon. muscor.

Leaves approached when moist, smaller than in the last; cells round-oval. Stem-leaves ovate-lanceolate subulate or broad-ovate obtuse with filiform point. Perichetial leaves nerveless. Capsule small suboval; teeth pale; segments split; cilia nodose; annulus large; lid with short thick often curved beak; pedicel smooth. Tufts green. — Trees and rocks r. *Amer.* Pacif. distr. r. Can.: Macoun. U. S.: Marshall A. Howe; Bolander, com. C. Mueller.

3. **T. Whipplei** Sullivant. — Hypnum Sull.; Thuidium Kindb.

Differs from the last: Leaves larger longer narrower and more distant; cells suboblong. »Pedicel of capsule rough; annulus none; perichetial leaves costate»: Lesq. et Jam. — Rocks r. *Amer.* Pacif. distr. Can.: Macoun.

II. Pseudo-Claopodium Kindb.

4. **T. laxifolium** Schwægrichen. — Hypnum Schw.; Thuidium Kindb.

»Leaves denticulate. Stem-leaves from ovate base short-acuminate; branch-leaves ovate. Capsule globose-ovate; cilia short, lid obliquely rostellate; pedicel rough. — Earth r. *Amer.* Northwest coast: Menzies»: C. M. syn.

5. **T. pseudo-pygmaeum** Kindb. (new name). — Hypnum pygmaeum Schimper, non Taylor; Sulliv. icon. muscor.; H. remotifolium Greville?

Leaves entire opaque short-acuminate very small; those of stem ovate-oblong, those of branches somewhat longer; costa often excurrent. Capsule very small suboval; cilia short; lid rostrate; pedicel smooth. Stem pinnate or bipinnate. — Wet rocks r. *Amer.* U. S.: Austin, com. Macoun.

III. Micro-Thuidium Kindb. (in check-list).

A. Leaves crisped when dry; cells rotundate. Paraphyllia numerous. Monoecious.

6. **T. minutulum** Hedwig. — Hypnum H.; Thuidium Br. eur.

Leaves entire subovate opaque; costa not excurrent. Stem-leaves us. short-acuminate; branch-leaves obtuse shorter; costa faint. Capsule small suboblong horizontal; cilia long; lid

long-rostrate; pedicel short. Stem pinnate or bipinnate. — Rocks and trees. *Eur.* r. Germany: Schimper. *Amer.* Can.: Macoun; Moser.

B. Leaves not crisped; inner cells gen. round-oval. Stem often pinnate; paraphyllia us. numerous. Monoecious.

7. *T. virginianum* Bridel. — Hypnum Brid. 1827; Thuidium Lindb.; Hypnum punctulatum Notaris 1834; Thuidium Not. 1863.

Leaves denticulate often opaque; costa vanishing in acumen or subexcurrent. Stem-leaves from round-ovate or ovate-oblong base abruptly long-acuminate, less distinctly denticulate; branch-leaves ovate oblong shorter-acuminate. Capsule red-brown us. arcuate strangulate; lid conic or convex, rostellate or apiculate; cilia long often appendiculate; pedicel long. Tufts green or brown-green. — Logs and stone in woods. *Eur.* r. Switzerland! Austria: Barth, com. Levier. *Amer.* Can. r.: Macoun.

*** *T. gracile*** Bruch et Schimper. — Hypnum B. S. 1843; Sull. icon. musc.; Thuidium Br. eur.

Leaves gen. less opaque. Capsule us. red; lid subobtusely short-apiculate. — *Amer.* not r. in eastern distr. Can.: Macoun; Moser. U. S.: Langlois, com. Cardot.

*** *T. pallens*** Lindberg. — *T. lignicola* Kindb. in Ottawa Natur. IV.

Leaves more distinctly serrulate. Capsule pale; lid subobtusely short-apiculate. — Logs r. *Eur.* Sweden near Stockholm: Lindberg. *Amer.* Can.: Macoun.

8. *T. scitum* Beauvois. — Hypnum B.; Thuidium Austin.

Leaves entire, more or less opaque but with shorter papillae than in the last; costa us. vanishing below acumen. Stem-leaves from round-ovate base abruptly acuminate; branch-leaves ovate subobtusely. Capsule brown us. faintly curved not strangulate; lid narrowly conic; cilia short not appendiculate; pedicel long. Tufts dark green. — Base of trees. *Amer.* not r. Can.: Macoun.

9. *T. pseudo-gracile* Kindb. n. sp.

Differs from *T. virginianum*: Leaves of stem broader, from very broad base more abruptly narrowed to the often falcate and gen. not long acumen, entire nearly smooth; branch-leaves entire or faintly denticulate. Capsules unknown. — Differs also from *T. scitum*: Leaves larger and broader; costa percurrent or excurrent. Stem-leaves shorter and more broadly revolute; branch-leaves ovate-oblong acuminate acute. — Logs r. *Amer.* Can. near Leamington: Macoun.

C. Leaves not crisped; inner cells gen. suboblong. Stem irregularly divided; paraphyllia few.

10. **T. pulchellum** Notaris. — *Amblystegium gracile* Juratzka; *Pseudoleskea* Schimper.

Leaves entire long-acuminate recurved below, faintly papillose; cells gen. suboblong; costa often percurrent. Stem-leaves from round-ovate base abruptly narrowed; branch-leaves ovate-oblong or ovate-lanceolate more gradually narrowed, indistinctly sinuate above. Perichetial leaves with long filiform point. Capsule oblong arcuate; segments and cilia short; lid conic obtuse. Tufts green, ferruginous below. Monoecious. — Resembling *Pseudoleskeella catenulata* and *Anomodon nervosus* in habit but easily distinct in narrower leaf-cells. — Rocks r. *Eur.* Switzerl.: Schimper.

11. **T. algarvicum** Schimper. — *Leskea* Sch.; *Thuidium* Kindb.; *T. Solmsii* C. M. in herb.

Leaves denticulate not recurved, very papillose; middle cells suboblong, upper and lower narrower; costa percurrent. Stem-leaves from ovate-oblong base long-acuminate; branch-leaves narrower, more distinctly serrulate all around. Capsules unknown. Dioecious. — *Eur.* r. Portugal: Solms-Laubach, com. C. Mueller.

IV. Eu-Thuidium.

A. Leaves acute very papillose; inner basal cells linear-lanceolate. Stem-leaves from broad-ovate base gen. long-acuminate; branch-leaves denticulate very short-acuminate; costa short.

a. Apical cell of branch-leaves narrow acute smooth. Perichetial leaves very papillose, fimbriate or long-ciliate.

12. **T. tamariscinum** Hedwig. — *Hypnum* H.; *Thuidium* Br. *eur.*

Leaves of stem faintly recurved. Lid of capsule apiculate or rostellate. Stem not creeping, us. tripinnate. — Earth and stone in woods. *Eur.* not r. Sweden, Switzerl., Germany!

b. Apical cell of branch-leaves broad bifid. Perichetial leaves smooth or sparingly papillose with few or none cilia and denticulate acumen.

13. **T. delicatulum** L. — *Hypnum* L.; *Thuidium* Mitten.

Stem-leaves recurved not long-acuminate, gen. entire. Perichetial leaves sparingly papillose sometimes with a few cilia. Capsule rostrate. Stem not creeping, us. bipinnate. — Earth and stone in woods. *Eur.* r. Sweden! *Amer.* not r. Can.: Macoun. U. S.: Wetherby; Langlois, com. Cardot.

14. **T. Philiberti** Limpricht 1895. — *T. recognitum* var. *radi-* *calicatus*
cans Kindb. *revue bryol.* 1892; *T. intermedium* Philibert 1893; *T. pseudo-tamarisci* Limpricht 1895.

Differs from the last: Stems creeping, often tripinnate and densely tufted. Stem-leaves larger and long-subulate. Perichetial leaves smooth without cilia. Tufts dark green. Plants gen. smaller. — Earth and rocks r. *Eur.* Switzerl. near Lugano and Faido! *Amer.* »U. S.«: Best.

15. **T. recognitum** Hedwig. — Hypnum H.; Thuidium Lindb.

Stem-leaves gen. not recurved and not long-acuminate, us. denticulate. Perichetial leaves smooth without cilia. Capsule apiculate. Stem not creeping or with few rhizoids at base, us. bipinnate. — Stone and earth in woods. *Eur.* nearly common below alp. regions. Sweden, Germany, Switzerl., France! *Amer.* less common. Can.: Macoun.

B. Leaves obtuse faintly papillose; those of stem broad-ovate short-acuminate; inner basal cells oblong; branch-leaves obtusate nearly entire; costa long.

16. **T. Alleni** Austin.

Leaves not recurved, those of stem entire; cells gen. rotundate, the apical one round-oval not bifid. Stem bipinnate not creeping. Capsules unknown. — Peat-bogs r. *Amer.* U. S.: Allen, com. Macoun.

V. Elodium Sullivant et Lesquereux.

A. Stem tomentose; paraphyllia long. Leaves large gen. faintly mamilllose; those of stem pellucid; cells gen. oblong-lanceolate. Capsule arcuate. Monoecious often fruiting.

a. All leaves mamilllose; those of branches not pellucid.

17. **T. Blandowii** Weber et Mohr. — Hypnum W. M.; Thuidium Br. eur.

Leaves from broad-ovate base long-acuminate, faintly denticulate all around; cells elongate gen. oblong-lanceolate, the basal pale. Lid of capsule reticulate. Stem erect pale-tomentose; branches crowded us. elongate attenuate. — Peat-swamps and wet meadows princ. in northern districts. *Eur.* Sweden and Norway not r.! *Amer.* r. Can.: Macoun; White; Waghorne U. S.: Roell, com. Cardot.

18. **T. pseud-abietinum** Kindb. note on Canad. bryol. 1893. — T. elodioides Renaud et Cardot in Hedwigia 1893.

Leaves orange at insertion; middle cells oval-oblong. Stem-leaves ovate short-acuminate faintly denticulate above. Branch-leaves ovate-oval subobtusate more distinctly denticulate, very opaque and mamilllose or papillose on both sides. Stem brown-tomentose; branches short distant. Lid of capsule not seen. — Woods r. *Amer.* Can.: Macoun; Waghorne. U. S.: Roell.

b. All leaves pellucid; those of stem smooth.
19. *T. paludosum* Sullivant. — *Hypnum* Sull. ic. musc.; *Thuidium* Kindb.

Leaves orange at insertion; cells oblong-lanceolate. Stem-leaves recurved ovate-lanceolate gradually long-acuminate, faintly denticulate above. Branch-leaves ovate-oblong shorter-acuminate faintly denticulate, slightly mamillate at back. Stem and branches as in the last. — Peat-bogs r. *Amer.* Can.: Macoun; White. U. S.: Austin, com. Macoun; Roell, com. Cardot.

B. Stem not tomentose; paraphyllia short. Leaves opaque very papillose us. not large; cells gen. suboval. Capsule faintly curved. Dioecious r. fruiting.

20. *T. abietinum* L. — *Hypnum* L.; *Thuidium* Br. eur.

Leaves brownish at insertion, appressed when dry, gen. not recurved. Stem-leaves from ovate base abruptly short-acuminate, entire or indistinctly crenulate. Branch-leaves subovate denticulate. Branches us. distant and brown-green. — Dry earth and stones r. in wet places. *Eur.* common. Sweden fruiting, Norway, Germany, Switzerl.! *Amer.* not r. Can.: Macoun.

* ***T. hystricosum* Mitten; Braithwaite.**

Leaves larger, less appressed when dry us. green; cells often suboblong. Capsules unknown. — Calcareous princ. wet hills r. *Eur.* Switzerl. near Freiburg 1855!

* ***T. pachycladon* Kindb.** note on Canad. bryol. 1893.

Leaves large, orange at insertion; those of stem ovate-lanceolate gradually long-acuminate; cells princ. the uppermost suboblong. Branches green crowded. Habit of *T. Blandowii*. Capsules unknown. — Wet places r. *Amer.* Can. Rocky mts: Macoun.

Fam. 13. **Hypnaceæ.**

46. ***Pylaisia* Bryol. eur.**

1. *Intricatæ*. Endostomial segments cohering to above middle with teeth. Branches julaceous often curved. Tufts very intricate green or dark green. Leaves entire, those of stem decurrent; alar cells small green very numerous. Capsule oblong or oval; teeth yellow. Spores large.

2. *Polyanthoidæ*. Endostome not cohering with teeth. Branches gen. not julaceous. Tufts less intricate. Leaves not distinctly decurrent, often denticulate; alar cells less numerous. Capsule often subcylindric; teeth often pale. Spores gen. small.

1. *Intricatæ*.

A. Leaves with ovate-lanceolate base; cells narrow sublan-
ceolate. Capsule oblong.

1. **P.intricata** Hedwig. — *Pterigynandrum* H.; *Pylaisia* Schimper; *Sulliv. icon. m.*

Leaves long-acuminate us. faintly recurved; perichetial sublinear-lanceolate not plicate, the inner with short subulate point. Lid of capsule with short oblique beak. Branches crowded. Tufts green. — Trees and logs. *Amer.* not r. *Can.*: Macoun. U. S.: Sullivant, com. C. Mueller. *Eur.* r. »Russia near river Svir»: Elfving.

2. **P.ontariensis** C. M. et Kindb. cat. *Canad. m.*

Differs from the last: Leaves more recurved and shorter acuminate; perichetial plicate ovate-oblong short-acuminate or obtusate. Peristomial teeth broader; lid obtuse. Branches less crowded. Tufts often dark green. — Trees. *Amer.* *Can.* eastern distr. not r. *Macoun*; Moser.

B. Leaves with short base; cells dilated.

3. **P.Selwyni** Kindb. in *Ottawa Naturalist* II.

Leaves subovate us. recurved to the short acumen; cells gen. suboblong. Perichetial leaves not plicate, ovate-oblong long-acuminate often filiform-pointed. Capsule broad-oval; lid obtuse. Branches crowded. Tufts dark green or brown. — Trees r. *Amer.* *Can.*: Macoun; Dearness and White. U. S.: Roell.

4. **P.cyrtophylla** Kindb. n. sp.

Leaves broad-ovate gen. obtusate obtuse, not or slightly recurved; cells oval, larger than in the 3 last species. Branches crowded. Tufts green. Capsules unknown. Old logs r. *Amer.* *Can.* Peace river: Macoun 1872.

2. Polyanthoideæ.

A. Leaves distinctly denticulate.

5. **P.heteromalla** Bruch et Schimper.

Leaves larger than in *P. polyanthos*; inner basal cells (at insertion) suboval not yellow, the others linear-lanceolate exc. the alar. Stem-leaves ovate-oblong filiform-pointed not recurved; branch-leaves shortly acuminate-subulate. Capsule oval-oblong; teeth dark yellow; cilia none; lid subobtusate. Branches us. curved and yellowish. — Trees and stones r. *Amer.* *Can.*: Macoun.

6. **P.pseudo-platygyrium** Kindb. cat. *Canad. m.*

Leaves ovate-lanceolate long-acuminate filiform-pointed, often recurved to acumen; inner basal and alar cells orange, the others sublinear. Capsule subcylindric pale with dark red border at mouth; peristome pale; segments widely open in middle, basal membrane low; lid short-pointed. Tufts brown-green. — Logs r. *Amer.* *Can.*: Macoun. U. S.: Roell.

7. **P. flari-acuminata** C. M. et Kindb. cat. Can. m.

Leaves as in the last but smaller; inner basal pale, the others sublinear exc. the alar. Capsule subcylindric brick-red; teeth yellow; segments rimose or narrowly open in middle, basal membrane elevate; lid conic obtuse. Tufts bright green.

— Trees r. *Amer.* Can. Rocky mts: Macoun.

B. Leaves entire or the uppermost faintly sinuate.

a. Stem-leaves recurved to the middle of basal borders; alar cells about 15—20. Stem creeping, sometimes with paraphyllia. Tufts green us. silky glossy.

8. **P. polyanthos** Schreber. — Hypnum Schr.; Pylaisia Br. eur.

Stem-leaves ovate-oblong filiform-pointed, yellow at insertion; cells sublinear-lanceolate exc. the alar. Branch-leaves ovate-lanceolate with subsubulate acumen or short filiform point, gen. not recurved. Perichetial leaves filiform-pointed. Capsule suboblong or subcylindric, contracted at mouth; teeth pale yellow; segments split; cilia rudimentary or wanting; lid short-pointed. Stem pinnate. Tufts green. — On trees, r. on rocks or roofs. *Eur.* common. Sweden, Germany, Switzerl., Italy! *Amer.* Can. not r.: Macoun.

b. Leaves not or near base recurved, entire; alar cells few not well defined. Stem not creeping. Tufts not or faintly glossy.

9. **P. suecica** Br. eur. — Thedenia Br. eur.; Pylaiea Lindberg.

Leaves small ovate-oblong or ovate-lanceolate, often long-acuminate; lower cells suboblong, middle rhombic-oval. Perichetial leaves apiculate. Capsule oblong-cylindric; teeth yellow; cilia short; lid rostrate. Stem irregularly divided or subpinnate; branches julaceous. Tufts green with few rhizoids. — Earth in subalp. region r. *Eur.* Sweden: K. F. Thedenius.

* **P. alpina** Kindb. n. subsp. — Hypnum polyanthos var. alpinum Kindb. Laubm. Schwed. u. Norw.

Leaves a little larger, less strongly appressed when dry; perichetial submuticous. Capsule narrow-cylindric; lid rostellate. Branches subfastigiate nearly simple. Tufts eradiculose yellowish green. — *Eur.* Norway near Kongsvold on a turf-roof in subalp. region! E. Adlerz.

10. **P. alpicola** Lindberg. — Stereodon (Pylaiea) Lindb.; Arnell musci Asiæ bor.; Pylaisia Kindb. check-list of Eur. and N. Am. Bryin.

Leaves ovate-oblong with long filiform falcate point, very small and not appressed; alar cells yellow, the others pale

sublinear. Plants bright green, sparingly radiculose. — Capsules unknown. — Stones in alp. region r. *Eur.* Sweden in Lapland: E. Nyman.

47. **Pylaisiella** Kindberg, new genus.

1.**P. velutina** Schimper. — *Pylaisia* Sch.; Sull. icon. m., in part.

Leaves entire from ovate-oblong base acuminate, recurved to acumen, subdecurent; upper cells, also the middle marginal, rhomboidal; inner cells sublinear-lanceolate, inner basal narrow orange; angular cells diversiform, special alar few large inflated brown or hyaline, inner angular small green numerous. Perichetial leaves plicate serrulate. Capsule large cylindric not contracted at mouth; teeth orange; segments split in two densely dentate legs, basal membrane very low; cilia none; pedicel long. Spores large. Branches not julaceous. Tufts green or brown-yellow. — Trees. *Amer.* Can. Macoun; Moser.

In the cited Sull. icon. m. leaves are longer acuminate, their alar cells not delineated, endostomial segments adhering in their whole length to the teeth.

2.**P. subdenticulata** Schimper. — *Pylaisia* Sch.; Sull. ic. m.

Leaves small ovate-lanceolate long-acuminate minutely denticulate at acumen, faintly recurved below, not decurrent; angular cells small green, the others sublinear. Perichetial leaves as in the last. Capsule small oblong-cylindric not contracted; teeth yellow; segments split, basal membrane elevate; cilia long sub-appendiculate; pedicel short. Spores small. Branches not julaceous. Tufts pale green or yellowish. Smaller than *Pylaisia polyanthos*. — Trees r. *Amer.* Can.: Waghorne. U. S.: Austin, com. Macoun.

48. **Raphidostegium** Notaris.

A. Capsule oblique or curved. Leaves entire below.

I. **Eu-Raphidostegium**. Branches not or faintly compressed. Leaves plurifarious us. small and crowded.

II. **Pseudo-Plagiothecium**. Branches complanate. Leaves subdistichous not densely crowded, sometimes large.

B. Capsule straight erect. Leaves denticulate all around.

III. **Pseudo-Pylaisia**. Branches not or faintly compressed. Leaves small not densely crowded.

I. **Eu-Raphidostegium**.

A. Leaves curved (incurved or subfalcate), distinctly denticulate above, with ovate-oblong base and short acumen, crowded. Stem creeping; branches crowded faintly compressed.

1. *R. recurvans* Michaux. — *Leskea* Mich.; *Raphidostegium* Sauerbeck et Jæger; *Hypnum* Schwægr.; Sull. icon. musc.

Leaves recurved gen. to middle, denticulate above it, with long filiform serrate point; alar cells orange. Perichetial leaves gradually long-acuminate, serrate only at the short point. Capsule suboblong curved; teeth orange; segments entire; beak long; pedicel us. somewhat long. Stem red. Tufts yellowish green. Dioecious but often fruiting. — Trees and logs. *Amer. Can.*: Macoun; White; Moser; Waghorne.

2. *R. Whitei* Kindb. n. sp.

Leaves faintly or not recurved, gen. entire below acumen, with serrate filiform or subulate point; alar cells hyaline. Perichetial leaves dentate at the long acumen. Capsule suboval curved or oblique; teeth pale; segments entire; beak not long; pedicel short. Stem pale or pale red. Tufts green. Monoecious. — Trees r. *Amer. Can. Ont.* near Edmonton 1892: J. White, com. Macoun.

B. Leaves not distinctly curved, gen. quite entire and small. Monoecious or (*R. subdemissum*) dioecious.

a. Branches not julaceous. Stem radiculose. Leaves recurved.

3. *R. demissum* Wilson. — *Hypnum* Wils.; *Raphidostegium* Notaris.

Leaves ovate-oblong acute sometimes short-acuminate, r. filiform-pointed, gen. entire and recurved all around; alar cells rotundate not large, upper lanceolate, the others linear. Perichetial leaves subulate-acuminate. Capsule very small suboval strangulate often arcuate; neck not distinct; teeth yellow, orange below; segments yellow; pedicel short. Tufts green or brown-green sparingly radiculose. — Wet rocks. *Eur.* r. Switzerl.! Engl.: Cunliffe Germany: Schimper; Boulay. *Amer.* less r. *Can.*: Macoun; Moser; Waghorne. U. S.: com. Macoun.

4. *R. Welwitschii* Schimper. — *Rhynchostegium* Sch.; *Raphidostegium* Sauerbeck et Jæger.

Differs from the last: Tufts compact bright or yellowish green silky glossy and velvet-like. Leaves ovate-oblong or ovate-lanceolate, long-acuminate often filiform-pointed; alar cells larger. Peristome paler. Perichetial leaves filiform-pointed. — Trunks of *Olea* and *Quercus* r. *Eur.* Italy: Bottini; Arcangeli.

5. *R. microcarpum* Bridel. — *Leskea* Brid.; *Raphidostegium* Sauerbeck et Jæger; *Hypnum* C. M.; Sulliv. ic. musc.

Differs from *R. demissum*: Leaves gen. acuminate, sometimes faintly sinuate. Capsule not strangulate r. arcuate; neck more

or less distinct; teeth yellowish; segments hyaline; pedicel very short. Tufts green or yellowish. — Trees r. *Amer.* U. S. south. states: Mohr, com. Macoun; Langlois and Sawyer, com. Cardot. ***R. admixtum** Sullivant. — Hypnum Sull.; Raphidostegium Kindb.

Capsule arcuate more distinctly necked; pedicel longer. — Trees r. *Amer.* »U. S.« Lesq. et Jam. (Cuba: Wright, herb. Sulliv., com. C. Mueller).

b. Branches julaceous. Stem not radiculose. Leaves entire, not or slightly recurved.

6.**R. subdemissum** Kindb. cat. Canad. m.

Leaves small ovate-lanceolate long-subulate; alar cells large, the others linear. Capsules unknown. Branches distant cuspidate yellowish green. Dioecious. — Rocks in arctic Pacif. distr. r. *Amer.* Alaska: J. M. Macoun.

7.**R. marylandicum** C. Mueller. — Hypnum demissum var. Lq. et J.

Leaves ovate-lanceolate subobtusely acute somewhat large; alar somewhat large, the others linear. Perichetial leaves subulate-acuminate. Capsule subobovate or oblong without neck, not stragulate, larger than in *R. demissum*; endostome yellow. Tufts olivaceous with green branch-tops. Plants robust. Monoecious. — Wet rocks r. *Amer.* U. S.: Sull. et Lesq. musci bor. amer. n. 442, com. C. Mueller.

II. Pseudo-Plagiothecium Kindb.

A. Leaves curved, distinctly denticulate above, from ovate-oblong base narrowed to acumen. Us. dioecious.

8.**R. laxepatulum** Lesquereux et James. — Hypnum (Raphidostegium) L. et J.; Raphidostegium Kindb.; Rhynchostegium delicatulum James; Sulliv. icon. m.

Leaves with somewhat long subsubulate dentate acumen; perichetial strongly dentate above to below middle. Capsule suboblong curved; teeth pale, papillose above; segments entire; cilia none; pedicel very short. Stem pale or greenish red, sparingly radiculose; branches distant. Tufts green. Habit of *Plagiothecium silvaticum*. Dioecious. — *Amer.* r. U. S.: Purpus, com. Roell.

9.**R. Lorentzii** Molendo. — Hypnum M.; Raphidostegium Kindb.

Leaves with more or less long gen. subulate denticulate acumen; perichetial denticulate above. Capsule oblong slightly curved; teeth golden yellow, papillose above; segments rimose; cilia long; pedicel not long. Stem red sparingly radiculose;

branches distant. Tufts bright or yellowish green. Dioecious. — Clayey ground or stones in subalp. region r. *Eur.* Germany: P. G. Lorentz.

10. **R. Roellii** Renauld et Cardot.

Leaves with short serrate often twisted point, small; perichetial dentate at acumen. Capsule oblong often curved; teeth pale yellow, papillose above; segments rimose or entire; cilia often long; lid rostrate; pedicel not long. Stem red sparingly radiculose; branches distant. Tufts bright green. Monoecious. — Logs r. *Amer.* Pacif. distr. Can.: Macoun. U. S.: Roell.

B. Leaves not distinctly curved, gen. quite entire.

a. Leaves subulate-acuminate.

11. **R. expallens** C. M. et Kindb. — Entodon cat. Canad. m.

Leaves large ovate-lanceolate or ovate-oblong with not long, sometimes faintly denticulate and at apex often deflexed acumen, not or indistinctly recurved; upper cells linear, alar large. Capsules unknown. Resembles *Brachythecium rivulare*. Dioecious. — Bogs by springs r. *Amer.* Can.: Macoun. U. S.: James, com. C. Mueller.

12. **R. carolinianum** C. Mueller. — Hypnum C. M. syn.

»Leaves narrowly ovate-lanceolate acuminate, recurved all around; perichetial entire. Capsule small obovate inclined. Branches compressed somewhat long and flaccid, dusky yellowish; stem long. Monoecious. — Wet rocks r. *Amer.* U. S.: Sullivan»: C. M.

b. Leaves obtusate (obtuse or acute).

13. **R. Kegelii** C. Mueller. — Leskea C. M.; Raphidostegium Renauld et Cardot; Hypnum C. M. syn.

Leaves small ovate more or less recurved; upper cells rhombic-oblong, lower lanceolate, alar small. Capsule narrowly cylindric subarcuate; pedicel somewhat long. Tufts dirty green. Monoecious. »Peristomial teeth short yellow»: C. M. syn. — Trees r. *Amer.* U. S.: Langlois, com. Cardot.

III. Pseudo-Pylaisia Kindb.

14. **R. cylindricarpum** C. Mueller. — Hypnum C. M.; Sullivan. m.

Leaves ovate-lanceolate curved, recurved below and (as the perichetial) serrate at acumen; alar cells large hyaline, the others linear. Capsule cylindric; teeth yellow; segments rimose; pedicel somewhat long. Tufts intricate us. brown-green or faintly glossy. Dioecious. — Logs in woods r. *Amer.* U. S.: Sullivan, com. C. Mueller; Purpus, com. Roell; Peck, herb. Austin, com. Macoun.

49. **Rhynchostegium** Bryol. eur.

I. **Eu-Rhynchostegium**. Stem with broad paraphyllia. Leaves nearly flat; costa short double or indistinct. Dioecious or monoecious.

II. **Pseud-Eurhynchium**. Leaves often concave; costa gen. simple or in some leaves indistinct. Often monoecious. Paraphyllia us. wanting, in *R. serrulatum* sometimes present.

I. **Eu-Rhynchostegium**.

A. Leaves more or less distant, not decurrent; alar cells not large or not well-defined. R. fruiting.

1. **R. depressum** Bruch.

Leaves narrowly ovate-oblong acute sometimes short-acuminate, serrulate above, nearly entire below; upper cells oval-oblong, middle oblong-lanceolate. Capsule suboval or arcuate stragulate; annulus double; lid rostrate; pedicel short. Stem creeping. Tufts glossy green. Dioecious. — Shady rocks. *Eur.* not common. Sweden, Germany, Switzerland.

2. **R. geophilum** Austin; Sullivant icon. muscor.

Differs from the last: Leaves somewhat larger and more distant, subobtusate, denticulate below; uppermost cells oval, lower lanceolate. Capsule not stragulate; annulus simple. Branches longer; stem nearly eradiculose. — Clayey shaded ground r. *Amer.* U. S.: Austin, com. Macoun.

3. **R. deplanatum** Schimper. — Hypnum Sch.; Sulliv. ic. m.; Rhynchostegium Kindb.; Hypnum (Rhynchostegium) Lq. et J.

Leaves ovate-oblong acute with short or more prolonged subulate acumen, serrulate above, minutely denticulate or nearly entire below, cells gen. linear-lanceolate, lower sometimes sub-oblong; costa often obsolete, sometimes double. Perichetial leaves with dentate long-subulate acumen. Capsule oval-oblong or arcuate, stragulate wide-mouthed plicate when dry; segments entire; lid rostrate, rostellate or obtuse; annulus none; pedicel often short. Stem depressed creeping; paraphyllia us. dentate. Tufts dense glossy green. Us. monoecious. Leaves often crowded. — On rocks or on base of trees. *Amer.* Can.: Macoun; Moser. — Male flowers not found by Sullivant.

4. **R. caloosiense** Austin. — Hypnum Austin.

Differs from the last in short pointed entire leaves and much longer entire paraphyllia. — Leaves broadly obliquely ovate subacuminate; areolation loose rhomboidal fusiform; costa geminate distinct to near middle. Capsule broadly oval much constricted; pedicel short. Monoecious. — *Amer.* r. U. S.: J. D. Smith, Austin; Lesq. et Jam.

B. Leaves crowded decurrent; alar cells large hyaline. Lid of capsule long-conic acute or short-conic rostellate.

5.R.membranosum Kindb. — *Plagiothecium* cat. Can. m.

Leaves flat ovate-oblong acute or short-acuminate, entire or above middle denticulate, patent or spreading; cells linear exc. the alar. Capsule cylindric or obovate arcuate, not constricted; teeth yellow; pedicel not long. Tufts dense glossy green, not or sparingly radiculose. Dioecious. — Logs in swamps r. *Amer.* Can.: Macoun; White.

II. *Pseud-Eurhynchium* Kindb.

A. Leaves crisped when dry; cells much dilated.

6.R.rotundifolium Scopoli. — *Hypnum* Scop.; *Rhynchostegium* Br. eur.

Leaves somewhat distant, not decurrent; costa vanishing near middle. Stem-leaves ovate gradually short-acuminate, nearly entire; cells suboblong, alar not defined. Branch-leaves shorter, broad-ovate abruptly short-acuminate, minutely denticulate all around; cells oval. Capsule suboval not large; lid rostrate; pedicel short smooth. Stem creeping. Tufts green. Monoecious. — Stones r. *Eur.* south. districts. Switzerl., Italy!

B. Leaves not crisped; cells gen. narrow.

a. Leaves distant; alar cells large. Lid of capsule not rostrate.

7.R.revelstokense Kindb. — *Eurhynchium* note on Can. bryol.

Leaves ovate-lanceolate long-subulate denticulate plicate and pellucid, sometimes short-decurrent; cells lanceolate exc. the alar; costa somewhat thick, vanishing above middle or shorter. Capsule arcuate; lid rostellate; pedicel short smooth. Stem creeping subpinnate or irregularly divided. Tufts pale or light green. Male flowers not found. — Logs r. *Amer.* Can. Brit. Col.: Macoun; N. Foundl.: Waghorne.

8.R.pseudo-serrulatum Kindb. — *Eurhynchium* Kindb. l. c.

Leaves ovate or ovate-oblong, minutely denticulate, striate and chlorophyllose, not or indistinctly decurrent; cells lanceolate, the lower shorter and more dilated; costa thin vanishing above middle. Stem-leaves with short-acuminate or filiform-pointed; branch-leaves with short subulate sometimes twisted point. Capsule arcuate; lid apiculate; pedicel rough very long. Stem subpinnate or irregularly divided. Tufts dark green, faintly glossy, radiculose at base. Monoecious. Habit of *R. serrulatum*. — Earth and stones in woods r. *Amer.* Can.: Macoun; Moser; Waghorne. U. S. New Jersey: com. Macoun.

b. Leaves gen. distant; alar cells not large.

aa. Leaves serrulate or serrate, gen. large; costa simple us. long.

9. *R. serrulatum* Hedwig. — Hypnum H.; Sullivant ic. m.; Rhynchostegium Kindb.; Hypnum (Rhynchostegium) Lq. et Jam.

Leaves serrulate pellucid neither striate nor decurrent; cells sublinear exc. the sometimes not well-defined alar; costa thin often reaching above middle. Stem-leaves filiform-pointed us. ovate-oblong; branch-leaves broadly ovate-lanceolate with short sublinear twisted point. Capsule arcuate; segments entire; annulus broad; lid rostrate; pedicel smooth us. long. Stem pinnate creeping, r. with paraphyllia. Tufts pale green. Monoecious. — On ground in dry woods. *Amer.* not r. *Can.*: Macoun. U. S.: Roell; Sullivant, com. C. Mueller; Fitzgerald, com. Renauld.

* ***R. eriense*** Kindb. — Eurhynchium note on *Can. bryol.*

Leaves subovate nearly crowded, shorter and less distant; alar cells more distinct. Capsule smaller; pedicel short. — *Amer. Can.*: Macoun. U. S.: Roell.

* ***R. hispidifolium*** Kindb. — Eurhynchium Kindb. l. c.

Branches longer. Leaves very long, ovate-lanceolate long-acuminate sharply serrate. Capsules und flowers unknown. — *Amer. r. Can. Brit. Col.*: Macoun.

bb. Leaves entire or near apex minutely denticulate.

10. *R. subintegrifolium* Kindb. — Eurhynchium Kindb. l. c.

Leaves decurrent chlorophyllose ovate-oblong short-pointed faintly striate; alar cells somewhat numerous, the others sublinear; costa mostly thin gen. reaching to acumen, sometimes thicker, shorter and forked. Capsule subobovate or arcuate; pedicel smooth; lid and male flowers not seen. Habit of *R. serrulatum*. — Logs r. *Amer. Can. Brit. Col.*: Macoun.

11. *R. styriacum* Limpricht et Breidler. — Limnobium Lpr. et Breidl. in sched.; Rhynchostegium Kindb.

Leaves (of branches) broad-ovate abruptly short-acuminate neither decurrent nor striate; cells oblong-linear exc. the dusky quadrate alar. Tufts yellowish not radiculose. Synoecious. Capsules not seen. — Inundated rocks r. *Eur. Austria* near Schladming; Breidler, com. Limpricht.

cc. Leaves minutely denticulate.

12. *R. bifariellum* Kindb. — Plagiothecium cat. *Can. m.*

Leaves small neither striate nor crowded nor distinctly decurrent; alar cells small few quadrate, the others gen. linear. Stem-leaves short somewhat broad ovate-cordate nearly entire

with falcate filiform nearly entire point; costa gen. obsolete. Branch-leaves broadly ovate-lanceolate; costa vanishing near or above middle. Capsules unknown. Stem pinnate sparingly radiculose. Tufts loose olive-green. Habit of *Eurhynchium Bolanderi*. — Wet places in woods r. Amer. Can. Vanc. isl.: Macoun.

50. **Taxithelium** Mitten.

1. **T. planum** Bridel. — Hypnum Brid.; Taxithelium Mitt.

Leaves from contracted base broadly suboval acute denticulate sometimes short-acuminate; alar cells subrectangular. Capsule small piriform inclined; teeth yellow; segments as high; cilia present; lid apiculate; pedicel reddish yellow very long. Stem prostrate subpinnate; branches approached. — Amer. r. »U. S.»: Lesq. et Jam. (Cuba: Wright, com. C. Mueller).

51. **Plagiothecium** Br. eur.

A. Branches complanate. Often dioecious.

a. Leaves undulate.

I. **Pseudo-Neckera**. Leaves decurrent large gen. quite entire. Capsule large arcuate; lid rostrate. Branches long often simple. Dioecious.

b. Leaves not undulate.

II. **Eu-Plagiothecium**. Leaves decurrent gen. quite entire often large. Capsule oblique or straight; lid r. rostrate. Plants often robust.

III. **Isopterygium**. Leaves not decurrent us. not large often denticulate. Capsule mostly oblique or arcuate; lid obtuse or rostellate. Plants not robust. Stem not long.

B. Branches not or faintly compressed. Monoecious.

IV. **Pseud-Isopterygium**. Leaves neither undulate nor decurrent nor large, gen. quite entire, sometimes curved when dry. Capsule straight or faintly curved; lid obtuse or rostellate. Stem sometimes long.

I. **Pseudo-Neckera** Kindb.

1. **P. undulatum** L. — Hypnum L.; Plagiothecium Br. eur.

Leaves subovate acute short-acuminate or obtusate, r. denticulate at acumen, short-decurrent, gen. crowded; upper cells narrow linear, lower lanceolate exc. the not well-defined alar. Leaves of the branchlets narrower, often long-acuminate. Capsule striate when dry; pedicel long. Branches pale or whitish green sometimes subturgid. Tufts gen. loose. — Earth and siliceous rocks in woods. Eur. not r. Sweden, Norway, Germany, France! Amer. Can.: J. Macoun. Alaska: J. M. Macoun.

P. striatellum Lide. Mahon

2. *P. neckeroideum* Schimper.

Leaves as in the last but distant long-decurrent; nearly all cells narrow-linear exc. the short and large alar and lowest basal. Capsule not striate; pedicel long. Stem more divided, branchlets thin flagelliform. Tufts dense green. Habit of *Neckera crispa*. — Shady humid places near waterfalls in woods of subalp. region r. *Eur.* Austria: Breidler, com. Warnstorf.

II. *Eu-Plagiothecium*.

A. Leaves gen. large. Capsule large more or less oblique or curved; lid rostellate-rostrate or r. obtuse; pedicel long.

a. Leaves distinctly decurrent; costa short double or indistinct.

3. *P. denticulatum* L. — *Hypnum* L.; *Plagiothecium* Br. eur.

Leaves long-decurrent gen. suboblong obtusate, sometimes short-pointed, us. green; lower alar cells of the decurrent part very dilated, upper alar not well-defined, the others oblong-lanceolate. Capsule subcylindric; lid not rostellate. Monoecious us. fruiting. — Logs and rocks, common. *Eur.* Sweden etc.! *Amer.* Can.: Macoun. *Mahon*

*** *P. subfalcatum*** Austin; Sulliv. icon. musc.

Leaves less decurrent, sinuate above, sometimes subfalcate. Capsules unknown. — Rocks r. *Amer.* U. S.: Austin, com. Macoun.

4. *P. silvaticum* L. — *Hypnum* L.; *Plagiothecium* Br. eur.

Leaves long-decurrent ovate-lanceolate gradually narrowed to a subulate point, us. dark green or olivaceous; cells as in the last. Capsule subcylindric; lid rostrate. Dioecious r. fruiting. — Rocks, less common. *Eur.* Sweden, Norway, Germany, Switzerl.! *Amer.* Can.: J. Macoun. Alaska: J. M. Macoun.

5. *P. Roesii* Hampe. — *Hypnum* Hampe; *Plagiothecium* Schimp. syn.; *P. Sullivantiae* Schimp., *Hypnum* Sull. icon. m.

Leaves smaller than in the last, short-decurrent suboblong obtusate or short-acuminate, abruptly tapering to a short filiform often curved point, us. yellowish or bright green; lowest cells wide, alar often well-defined, the others sublinear-lanceolate. Capsule subcylindric nearly straight; lid rostrate-rostellate. Tufts very dense. Dioecious, less often fruiting. — Sandy or clayey ground. *Eur.* r. Sweden, Switzerl.! France: Husnot. *Amer.* not r. Can.: Macoun; Moser; Waghorne. U. S.: Roell; Sullivant, com. C. Mueller.

b. Leaves less distinctly decurrent; costa gen. indistinct, sometimes thick and simple but very short.

6. *P. brevipungens* Kindb. cat. Canad. m.

Leaves subovate or ovate-oblong acute often short-pointed; upper cells sublinear, lower lanceolate exc. the dilated well-defined alar. Capsule arcuate; lid conic obtuse not rostellate. Tufts dense green. Stem subpinnate. Leaves somewhat smaller than in *P. denticulatum*. Monoecious. — Stones in woods r. *Amer. Can.*: Macoun.

B. Leaves and capsules small; pedicel short.

a. Leaves not recurved.

7. *P. lætum* Schimper. — *Leskea* Berggren.

Leaves ovate-lanceolate acuminate gradually tapering to a short filiform point; alar cells large well-defined, the others oblong-lanceolate. Capsule oval-oblong subsymmetric; lid rostellate. Tufts bright green. Monoecious. — Alp. and subalp. rocks r. *Eur. Norway!*; Berggren. *Amer. Can.*: Macoun.

8. *P. decursivifolium* Kindb. cat. Can. m. — »*P. passaicense*» Austin in part.

Leaves narrowly suboblong often with short aciculiform point; lowest basal cells short large, alar not well-defined, the others narrow-linear. Capsule suboblong or arcuate, finally furrowed and oblique; lid rostellate or rostrate; pedicel somewhat long. Tufts green. Monoecious. — On decaying trees r. *Amer. Can.*: Macoun; Waghorne.

9. *P. latebricola* Wilson. — *Leskea* Wils.; *Plagiothecium* Br. eur.

Leaves smaller than in *P. pulchellum*, gen. filiform-pointed. Stem-leaves ovate-oblong subobtusate long-pointed; branch-leaves ovate lanceolate gradually tapering to a short sometimes subulate point; alar cells not well-defined, the others narrow-linear. Capsule cylindric-oblong straight; lid rostellate. Tufts bright green. Dioecious. — On decaying trees or ferns in shady woods r. *Eur. Sweden*: J. Persson. *Germany*: H. Mueller, com. *Le Jolis. Belgium*: Gravet. *Amer.* »U. S. and Can.»: Lesq. et Jam.

b. Leaves more or less recurved.

aa. Leaves recurved to the gen. long filiform point.

10. *P. piliferum* Swartz. — *Leskea* Sw.; *Plagiothecium* Br. eur.

Leaves suboblong; alar cells not well-defined, the others narrow-linear. Capsule cylindric-oblong straight; lid rostellate. Tufts green us. glossy. Monoecious. — Shady rocks or their crevices gen. r. *Eur. Sweden* not r., *Norway!* *Amer. Can. Pacif. distr.*: Macoun.

bb. Leaves partly recurved below, without long point.

11. *P. aciculari-pungens* C. M. et Kindb. cat. Can. m.

Leaves ovate-oblong with short aciculiform deflexed or patent

point, narrowly recurved below middle at one side; alar cells few often large, the others oblong-lanceolate. Capsule suboblong oblique not curved; lid apiculate. Tufts dense glossy green. Branches few short not attenuate. Monoecious. Resembles a small state of *P. Roosei*. — *Amer. r. Can.*: Macoun.

12. *P. attenuatirameum* Kindb. cat. Canad. m.

Lower leaves broadly ovate obtuse or obtusate, recurved to above middle at least at one side; lower basal cells dilated nearly uniform, the others oblong lanceolate; costa sometimes simple and reaching to middle. Other leaves gradually smaller upwards, narrower, more acute or acuminate. Branches long-attenuate flagelliform above. Tufts loose faintly shining. Capsules unknown. — *Rocks r. Amer. Can.*: Macoun.

III. *Isopterygium* Mitten.

A. Leaves distinctly denticulate, not recurved. Capsule annulate.

a. Leaves denticulate nearly all around; alar cells gen. distinct. Monoecious, us. fruiting.

13. *P. silesiacum* Seliger. -- *Hypnum* Sel.; *Plagiothecium* Br. eur.

Leaves ovate-lanceolate long-cuspidate crowded; cells narrow-linear exc. the alar. Capsule somewhat large subcylindric arcuate not striate; teeth pale; lid obtuse; pedicel long. Tufts green. Branches us. curved deflexed. — On logs in woods, r. on rocks. *Eur.* not r. Sweden common, Norway, Switzerl.! *Amer. r. U. S.* near Washington: Roell.

14. *P. turfaceum* Lindberg; *Sulliv.* icon. m.

Differs from the last: Leaves smaller shorter and less crowded, narrowly ovate-oblong shorter-cuspidate; cells linear-lanceolate. Capsule smaller, narrowly ovate-oblong, striate when dry; pedicel less long. Tufts bright green. Branches us. not curved. — Turfy soil and rocks. *Eur. r. Sweden*!; S. O. Lindberg. *Amer.* not r. princ. in eastern distr.: Macoun; Moser; Waghorne.

* *P. pseudo-silesiacum* Schimper.

» Lower leaves oval narrowly acuminate spreading, the upper appressed. — *Amer. U. S. r.*: Lesq. et Jam.

b. Leaves distantly denticulate in upper third; cells linear, alar not distinct. Dioecious very r. fruiting.

15. *P. elegans* Hooker. — *Hypnum* Hook.; *Plagiothecium* Schimper; *Sulliv.* icon. musc.

Leaves ovate-lanceolate short-cuspidate often somewhat large. Capsule small obovate or oblong, not or slightly curved; teeth pale; segments entire; cilia long not appendiculate; lid acute or

rostellate; pedicel often long and at apex arcuate. Perichetial leaves long-acuminate filiform-pointed denticulate above. Tufts green. Stem often furnished with small shoots or filiform branchlets, falling off to propagation. — Shady rocks and earth, gen. not r. *Eur.* Sweden, Germany, Switzerl.! *Amer.* Can. less r. fruiting: Macoun; Waghorne.

B. Leaves nearly entire or near apex faintly denticulate; alar cells distinct, the others narrow-linear. Capsule not annulate. Monoecious.

16. *P. albulum* C. Mueller. — *Hypnum* C. M.; *Plagiothecium* Kindb.; »*Hypnum micans* Swartz»: Lesq. et Jam.

Leaves small green ovate-oblong not recurved, us. short-acuminate or with short twisted point. Capsule very small indistinctly necked, more or less oblique or arcuate; lid rostellate or r. obtuse mamillate. — Trees and stones r. *Amer.* Can.: Macoun. U. S.: Langlois, com. Cardot.

17. *P. fulvum* Hooker et Wilson. — *Hypnum* H. W.; Sull. ic. m.; *Plagiothecium* Kindb.

Leaves larger than in the last, fulvous or golden glossy ovate-oblong recurved below. Perichetial leaves longer-acuminate. Capsule shorter and thicker with thick neck; lid mamillate. Tufts nearly eradichulose. — Swamps r. *Amer.* U. S.: Langlois, com. Cardot.

C. Leaves small gen. entire. Us. dioecious.

a. Costa of leaves short double or indistinct. Dioecious.

18. *P. nitidulum* Wahlenberg. — *Hypnum* Wng fl. lappon.; *Plagiothecium* Schimper; *P. Muellermanum* Schimp.; Sull. ic. m.

Leaves ovate-lanceolate gradually tapering to a filiform often long point, quite entire, distant; cells narrow-linear, alar not distinct. Capsule small cylindric-oblong or subobovate, gen. oblique and faintly cernuous, annulate; cilia short; lid rostellate; pedicel short. Tufts loose glossy green. — Rocks and earth, gen. r. *Eur.* Sweden (not r.), Switzerl.! *Amer.* Can.: Macoun; Moser. — *P. Muellermanum* Schimp. (syn.) differs only in smaller narrower leaves and looser tufts. — *Eur.* Switzerl.! France: Spruce, com. Boswell.

19. *P. pseudo-lutebricola* Kindb. cat. Canad. m.

Leaves entire less distant, from broadly ovate-lanceolate base suddenly tapering to a straight filiform somewhat long point; alar cells few often not distinct, the others narrowly linear. Capsule obovate-oblong oblique slightly curved often pendent; teeth pale; cilia long subappendiculate; lid conic; pedicel short.

Branches often curved; branchlets longer with smaller narrower leaves. Tufts dense glossy green. — On rotten wood r. *Amer.* Can.: Macoun; Moser.

20. *P. passaicense* Austin.

Leaves ovate-oblong short-acuminate sinuolate at acumen, nearly crowded, shorter than in the both last; lowest basal cells dilated, alar distinct, the others linear or linear-lanceolate. Capsule very small suboblong oblique or slightly curved, annulate; teeth pale; pedicel not long. Tufts green. — Logs in swamps r. *Amer.* Can.: Macoun.

b. Costa of leaves sometimes simple but very thin, reaching to middle. Monoecious.

21. *P. geminum* Mitten. — *Stereodon* Mitt.; *Plagiothecium* Kindb.

Leaves distant ovate-oblong short-acuminate nearly entire or slightly denticulate at acumen or below it; alar cells few us. distinct, the others linear. Capsule subcylindric nearly straight; pedicel short. — Rocks r. *Amer.* Can.: Macoun; Waghorne.

IV. Pseud-Isopterygium Kindb.

22. *P. pulchellum* Hedwig. — *Leskea* H; *Plagiothecium* Br. eur.

Leaves entire ovate-oblong or broadly ovate-lanceolate, gradually tapering to a gen. short point; cells lanceolate-linear, alar not distinct. Capsule subcylindric often straight erect, annulate; lid apiculate or rostellate; pedicel sometimes long. Stem short. Tufts dense green. Leaves gen. smaller than in *P. nitidulum* and nearly crowded. — Rocks and their crevices princ. in alps. *Eur.* not r. Sweden and Norway common in alps! Switzerland; Schimper. *Amer.* Can.: Macoun; Waghorne. Greenl.: Berggren.

23. *P. Bottinii* Breidler.

Leaves larger than in the last, slightly denticulate at acumen, ovate-oblong or ovate-lanceolate gen. abruptly narrowed to a long filiform-pointed acumen; basal cells dilated, alar subquadrate not much wider, the others sublinear. Capsule small subcylindric or suboblong without distinct neck, oblique or curved; lid obtuse; pedicel long subcapillary; annulus not seen. Stem long. Tufts loose green or yellowish. — Peat-bogs r. *Eur.* Italy: A. Bottini.

52. *Stereophyllum* Mitten.

1. *S. Wrightii* Sullivant. — *Hypnum* (Omalia) Sull. ic. musc.; »*Stereophyllum* Mitt.»: C. M.

Leaves distant ovate-oblong or sublinear-oblong gen. obtusate, faintly denticulate above, inflexed below at one side, not large;

costa vanishing above middle. Capsule small subobovate sub-erect; teeth pale yellow scarcely higher or broader than segments; cilia shorter; lid conic or rostellate; calyptra narrow; pedicel longish. Stem creeping. Tufts green or golden glossy. Habit of *Neckera* (Homalia). — Roots of trees r. *Amer.* U. S.: herb. Lesquereux, com. Renauld (Cuba: Wright, herb. Sullivan, com. C. Mueller).

53. *Amblystegium* Bryol. eur.

1. *Eu-Amblystegium*. Leaves not distinctly recurved; alar cells few or indistinct.

a. Leaves decurrent.

1. *Compacta*. Leaves with well-defined alar cells; costa subpercurrent. Tufts compact with intricate stems. Us. monoecious.

b. Leaves not or indistinctly decurrent.

2. *Serpentia*. Leaves crowded or not long-distant; alar cells gen. not well-defined; costa simple. Capsule somewhat large; pedicel long. Us. monoecious.

3. *Speirophylla*. Leaves long-distant very small; alar cells us. indistinct; costa simple or obsolete. Capsule small; pedicel short. Dioecious.

4. *Subtilia*. Leaves small crowded; alar cells distinct; costa gen. obsolete. Capsule small; pedicel short. Tufts dense. Monoecious.

II. *Ptycholoma*. Leaves recurved gen. to middle; alar cells numerous green. Leaves crowded not decurrent; costa us. obsolete. Capsule small; pedicel short. Monoecious.

I. *Eu-Amblystegium*.

1. *Compacta*.

A. Leaves short-decurrent nearly crowded. Tufts very radiculose.

1. *A.compactum* C. Mueller. — Hypnum C. M.; Sulliv. ic. m.

Leaves recurved near base, ovate-oblong short-acuminate or ovate-lanceolate acute, minutely denticulate princ. below; alar cells not large, the others oblong-lanceolate us. pellucid. Capsule small oblong-cylindric with distinct neck, gen. suberect nearly straight; lid acute or apiculate; teeth pale yellow; cilia very short; pedicel long. Tufts somewhat high, green above, us. decolorate or red-brown below. Branches erect. Monoecious. — Logs r. *Amer.* Can.: Waghorne; Drummond, com. C. Mueller. *Eur.* »France»: Husnot revue bryol. 1896.

2. *A.subcompactum* C. M. et Kindb. cat. Can. m.

Differs from the last: Leaves long-acuminate not recurved; inner cells lanceolate-linear. Capsule longer, often curved; lid

rostellate. — Trees in swamps r. *Amer.* Can.: Macoun. U. S.: Roell; Kelsey, com. Cardot.

B. Leaves long-decurrent very distant. Tufts sparingly radiculose. Capsules unknown.

3. A. dissitifolium Kindb. cat. Canad. m.

Leaves from subcordate or ovate base tapering to a sometimes long acumen, denticulate all around; alar cells somewhat large, the others oval-oblong very chlorophyllose. Tufts low green. Dioecious. — Wet limestone rocks r. *Amer.* Can. near Niagara and Owen Sound; Macoun.

2. *Serpentia*.

4. A. varium Hedwig. — *Leskea* H.; *Amblystegium* Lindb. in part.

Leaves broadly ovate-lanceolate or ovate-oblong, often entire; middle cells gen. oval-oblong; costa gen. long, also in perichetial leaves not excurrent. Capsule curved; annulus compound. Stem decumbent. Monoecious. — Logs, trees and stones, not uncommon. *Eur.* Sweden. Norway, Switzerl., Italy! *Amer.* Can.: Macoun; Waghorne.

* **A. radicale** Beauvois. — *Hypnum* Beauv.; *Amblystegium* Br. eur.

Leaves smaller and more distant, denticulate; cells gen. oblong; costa less long. — *Eur.* Switzerl.! Finl.: Lindberg.

* **A. porphyrhizon** Lindb. in Schimp. syn.

Leaves small and less broad, denticulate and crowded; cells suboblong; costa faint often vanishing near middle. Confounded with *A. serpens*. — *Eur.* not r. Sweden common, Germany, Switzerl.! Engl.: Rogers. *Amer.* Can. common; Macoun; Waghorne.

* **A. Juratzkæ** Schimper.

Leaves somewhat small denticulate more distant; cells gen. oblong-lanceolate; costa subpercurrent. *Eur.* Sweden, Switzerl., Germany! *Amer.* Can.: Macoun. U. S.: Roell.

* **A. leptophyllum** Schimper.

Leaves somewhat small denticulate crowded; cells oblong-lanceolate; costa subpercurrent. — *Eur.* France: Philibert.

5. A. orthocladon Beauvois. — *Hypnum* Beauv.; Sulliv. ic. m.; *Amblystegium* Kindb.

Leaves larger than in *A. varium* and very chlorophyllose, from ovate-oblong base acuminate, distant and nearly spreading; middle cells gen. suboval; costa subpercurrent, broader than in *A. varium*, in perichetial leaves still broader and excurrent. Capsule us. suberect faintly curved; annulus simple; pedicel

often very long. Branches often erect. Dioecious. — Wet places. *Amer. Can.*: Macoun. U. S.: Sullivant, com. C. Mueller. 6. *A. serpens* L. — Hypnum L.; Amblystegium Br. eur.

Leaves narrower than in *A. varium*, gen. smaller and less chlorophyllose, often entire; middle cells gen. suboblong; costa faint more abbreviate. Stem-leaves narrowly suboblong-lanceolate, not much dilated at base; branch-leaves sublinear-lanceolate. Perichetial leaves long-acuminate. Capsule curved; annulus compound; pedicel long. Stem decumbent. — Trees, logs and stones gen. common. *Eur. Sweden etc.*! *Amer. Can.*: Macoun; Waghorne. U. S.: Roell, com. Cardot.

* *A. Columbiæ* Kindb. bull. Torr. club XVII.

Leaves denticulate all around, nearly spreading; cells oblong-lanceolate; costa sometimes reaching into acumen. Perichetial leaves short-acuminate. Habit of *Campylium*. — Wet logs r. *Amer. Can. Brit. Col.*: Macoun.

3. *Speirophylla*.

A. Leaves with subpercurrent costa. Capsules unknown.

7. *A. speirophyllum* Kindb. in Ottawa Naturalist IV.

Leaves obtusate subacute or short-acuminate, subcordate or oval-oblong, entire or slightly denticulate; cells suboval; costa gen. thin. — Rocks r. *Amer. Can. N. Brunsw.*: Moser. U. S.: Roell.

8. *A. distantifolium* Kindb. cat. Canad. m.

Leaves ovate-lanceolate long-acuminate serrulate all around, chlorophyllose and sometimes subdecurrent; cells suboblong; costa thick sometimes subexcurrent. — Rocks r. *Amer. N. Foundl.*: Waghorne.

B. Leaves with short often obsolete costa.

a. Leaves narrow gen. acute.

9. *A. Sprucei* Bruch. — Hypnum Bruch; Amblystegium Br. eur.

Leaves narrowly ovate-oblong or sublinear gen. long-acuminate entire; cells oval-oblong; costa gen. indistinct. Perichetial leaves coarsely dentate above. Capsule suboblong-piriform or finally turbinate; teeth pale; lid subobtuse. R. fruiting. Dioecious. — In caverns of rocks or in swamps princ. in alps, often mixed with an hepatic (*Blepharostoma trichophyllum*). *Eur. Sweden, Norway*! *Amer. Can.*: Macoun.

* *A. minutissimum* Sullivant et Lesquereux. — Hypnum Sulliv. icon. musc.

Leaves more distinctly denticulate; costa often distinct. Tufts less loose. »Sometimes monoecious»: Sulliv. l. c. — *Amer.*

in lower districts not r. Can.: Macoun. U. S.: Sullivan, com. C. Mueller. *Eur.* r. Norway near Lille Elvedal: S. O. Lindberg and E. Nyman.

10. *A.fenestratum* Kindb. cat. Canad. m.

Leaves subhyaline denticulate narrowly ovate-lanceolate or sublinear; cells narrowly oblong; costa more or less distinct. Capsules unknown. — Borders of ponds r. *Amer.* Can.: Dearness, com. Macoun.

b. Leaves broad gen. obtuse.

11. *A.Holzingeri* Renauld et Cardot in bot. gazette.

Leaves entire subovate or ovate-oblong, sometimes short-acuminate subacute; cells suboval, princ. the upper, or suboblong; costa van' hing near middle or short forked. Perichetial leaves entire. Capsule suboval stragulate oblique or arcuate; pedicel less than 1 centim. long. *Amer.* r. »U. S.: Holzinger»: Ren. et Card. l. c.

4. Subtilia.

A. Leaves entire; costa sometimes reaching to middle. Endostome with short or none cilia.

12. *A.subtile* Hedwig. — Leskea H.; Amblystegium Br. eur.

Stem-leaves subovate-lanceolate; middle cells suboblong; branch-leaves narrower. Perichetial leaves entire us. costate. Capsule subsymmetric; lid apiculate. Tufts greenish. — On trees or r. on rocks. *Eur.* not r. Sweden! *Amer.* Can.: Macoun.

B. Leaves denticulate, at least those of branches; costa obsolete. Cilia of endostome us. long.

13. *A.confervoides* Bridel. — Hypnum Brid.; Amblystegium Br. eur.

Stem-leaves broadly ovate-lanceolate long-acuminate; middle cells suboblong; branch-leaves narrower, patent when moist. Capsule gen. arcuate; lid apiculate. Perichetial leaves denticulate. Tufts green. — Rocks gen. r. *Eur.* Sweden, Norway, Switzerl.! *Amer.* Can.: Macoun; Waghorne.

14. *A.pseudo-confervoides* Kindb. revue bryol. 1895.

Leaves smaller shorter and less distinctly denticulate than in the last; cells wider, oval-oblong. Stem-leaves ovate-oblong obtusate acute or short-acuminate. Branch-leaves suberect when moist. Capsule arcuate; lid conic obtuse; pedicel very short. Perichetial leaves nearly entire. Stems and branches subjuncous. — Limestone rocks r. *Amer.* Can.: Macoun.

15. *A.tenuissimum* Guembel.

Stem-leaves narrowly ovate-lanceolate, faintly denticulate;

middle cells suboblong. Branch-leaves distant narrower. Capsule subsymmetric or faintly curved; lid not apiculate. Tufts green. — Earth and trees r. *Eur.* Switzerl. near Lugano and in Graubunden!

II. *Ptycholoma* Kindb.

16. *A. adnatum* Hedwig. — Hypnum H.; Sulliv. icon. m.; Amblystegium Kindb.

Leaves entire gen. subovate obtusate; alar cells subquadrate on a narrow space, the others chlorophyllose gen. suboval. Capsule often arcuate; teeth yellowish; cilia often long; lid apiculate or obtuse. Perichetial leaves serrulate at the short acumen. Tufts green or dark green. — Stones and trees. *Amer.* not r. Can.: Macoun; Moser. U. S.: Sullivant, com. C. Mueller.

54. *Platyloma* Kindberg, new genus*).

1. *P. Lescurii* Sullivant. — Hypnum Sull. icon. m.

Leaves distant chlorophyllose opaque, minutely denticulate all around, not decurrent; costa thick subpercurrent. Stem-leaves broadly round-ovate, abruptly short-acuminate; inner cells lanceolate-linear, alar obsolete. Branch-leaves ovate subobtuse or acute; cells oval-oblong. Perichetial leaves ovate-lanceolate; costa excurrent. Capsule suboblong or arcuate; teeth golden yellow, connate at base; segments as high, split in middle; cilia long not appendiculate; annulus large compound; lid obtuse mamillate; pedicel 2—3 centim. long. Stem irregularly branching. Tufts dark green. Monoecious. — Moist rocks r. *Amer.* U. S.: Roell; Lesquereux, com. Renauld.

55. *Calliergon* Kindberg, new genus.

(Hypnum, subsp. *Calliergon* et *Limnobium*, Sullivant.)

A. Capsule not annulate. Leaves entire.

I. *Eu-Calliergon*. Leaves not falcate; alar cells large; costa long gen. subpercurrent. Pedicel of capsule long. Stem not creeping but sometimes radiculose below, often pinnate. Dioecious or (*C. cordifolium*) monoecious.

II *Limnobium*. Leaves of stem not falcate, those of branches often falcate; alar cells not large; costa abbreviate sometimes double or indistinct. Pedicel of capsule shortish. Stem creeping not pinnate. Monoecious.

B. Capsule annulate. Leaves sometimes denticulate.

a. Stem pinnate eradiculose. Leaves entire; costa double very short or indistinct. Dioecious.

*) This peculiar genus is nearly similar to *Limbella* C. M. in sched., found in S. Amer. only in barren state.

III. **Pseud-Acrocladium**. Leaves not falcate; alar cells very large. Branches cuspidate by convolute leaves.

IV. **Scorpidium**. Branches not cuspidate, their leaves falcate; alar cells indistinct.

b. Stem not pinnate, sometimes radiculose.

V. **Pseudo-Limnobia**. Alar leaf-cells gen. distinct.

aa. Costa of branch-leaves subpercurrent. Stem eradiculose.

1. **Radiiformia**. Leaves entire not decurrent, those of branches often falcate. Dioecious very r. fruiting.

bb. Costa of leaves gen. short or indistinct.

2. **Ochraceiformia**. Leaves entire or nearly so, decurrent and distant; those of branches often falcate. Stem eradiculose. Dioecious r. fruiting.

3. **Molliformia**. Leaves not or indistinctly decurrent, sometimes denticulate, gen. crowded and not falcate. Stem not creeping us. eradiculose. Often monoecious.

4. **Montaniformia**. Leaves small sometimes decurrent, us. denticulate; those of branches often falcate. Stem creeping. Us. monoecious.

I. Eu-Calliergon.

A. Leaves gen. decurrent.

1. **C. cordifolium** Hedwig. — Hypnum H.

Leaves us. distant and large; upper cells linear-lanceolate, the lower (below middle) suboblong hyaline. Stem-leaves gen. subovate; costa subpercurrent. Capsule large; lid obtuse mamillate or apiculate. Stems loosely tufted, r. radiculose; branches gen. long and simple. Tufts us. green. Us. monoecious. — Swamps and other wet places not r. but not common. *Eur.* Sweden! *Amer.* Alaska: J. M. Macoun. Can: Macoun; Moser; Waghorne.

* **C. Richardsoni** Mitten. — Stereodon Mitt; Hypnum Lesq. et Jam.; H. Breidlerii Juratzka; H. cyclophyllatum Holzinger.

Leaves less distant; only the lowest basal cells dilated; the alar sometimes more distinct. Tufts more dense, often brownish with golden glossy branch-tops. Stem pinnate; branches not long. — *Eur.* Sweden, Norway! Austria: Breidler. *Amer.* Can.: Macoun.

2. **C. giganteum** Schimper. — Hypnum Sch.

Differs from *C. cordifolium*: Leaves nearly crowded; cells sublinear except the large hyaline alar. Tufts dense green or brownish. Branches pinnate with numerous branchlets. Dioecious very r. fruiting. — Swamps, common. *Eur.* Sweden, Norway! *Amer.* Can.: Macoun; Moser.

3. *C. stramineum* Dickson. — Hypnum Dickson.

Leaves oval-oblong nearly crowded or distant, smaller than in *C. cordifolium*, sometimes with red rhizoids at apex; cells gen. sublinear except the large red or hyaline alar and the often round-oval apical; costa more or less abbreviate. Capsule somewhat large; lid mamillate. Stem sparingly divided; branches long not rigid. Tufts gen. pale green, sometimes whitish or brownish, not radiculose. Dioecious. — Peat-bogs. *Eur.* common. Sweden, Norway, Switzerl. *Amer.* Can. not r.: Macoun; Moser; Waghorne.

*** *C. laxifolium* Kindb. n. subsp.**

Leaves narrower, very distant and longer decurrent; cells wider; costa subpercurrent. — *Amer.* Greenl.: Vanhoeffen.

*** *C. nivale* Lorentz. — Hypnum Lor.; Schimper.**

Leaves smaller and crowded, broadly oval-oblong, appressed when dry; cells often somewhat dilated. Branches us. whitish or yellowish green. — Alpine bogs r. *Eur.* Norway! Austria: Lorentz.

B. Leaves not decurrent.

4. *C. sarmentosum* Wahlenberg. — Hypnum Wng.

Leaves red or brown-red (r. green) somewhat small and crowded, narrowly ovate-oblong or oblong-lanceolate; cells linear except the short dark red near base and the larger alar; costa gen. red and subpercurrent. Capsule smaller than in *C. cordifolium*; lid sometimes rostellate. Stem irregularly divided or subpinnate with short branches. Dioecious. — Swamps princ. in alps, gen. r. *Eur.* Norway (common and not r. fruiting)! *Amer.* Can.: Macoun; Waghorne.

II. Limnobion Kindb.

5. *C. palustre* L. — Hypnum L.

Leaves subovate often small, us. crowded, sometimes decurrent; cells sublinear (or the upper oblong-lanceolate) except the often orange-colored alar; costa variable, sometimes wanting. Stem-leaves obtusate subacute; branch-leaves gen. acute or short-acuminate. Capsule not large often curved; lid acute or apiculate. Tufts us. dirty green. — In or near mostly running water, common. *Eur.* Sweden, Norway, Switzerl., Italy! *Amer.* Can.: Macoun; Moser.

III. Pseud-Acrocladium Kindb.

6. *C. cuspidatum* L. — Hypnum L.; Acrocladium Lindb.

Stem-leaves broad-ovate obtuse or ovate-oblong subacute, subdecurrent; upper cells oblong-lanceolate, middle linear, lower

inner basal shorter and dilated, alar hyaline or red. Capsule large arcuate; lid acute; pedicel very long. Tufts dirty green or yellowish sometimes glossy. — Wet places. *Eur.* common. Sweden (often fruiting), Germany, Switzerl. *Amer.* not common. Can.: Macoun; Moser.

IV. *Scorpidium* Schimper.

7. *C. scorpioides* L. — *Hypnum* L.

Leaves suboval-oblong not decurrent, us. very large; cells gen. linear, the lowest basal shorter and wider. Stem-leaves obtuse sometimes apiculate; branch-leaves obtuse or acute. Capsule large arcuate; lid apiculate; pedicel very long. Tufts us. brownish with golden glossy branch-tops. R. fruiting. — Peat-bogs princ. in northern distr. *Eur.* Sweden, Norway (common)! *Amer.* Can.: Macoun.

V. *Pseudo-Limnobion* Kindb.

1. *Badiiformia*.

8. *C. badium* C. J. Hartman. — *Hypnum* Hartman.

Stem-leaves suboval short-apiculate; cells gen. linear orange-colored, the alar nearly indistinct; costa of some leaves short double. Branch-leaves ovate-oblong short-acuminate acute; costa subpercurrent. Capsule not large, more or less curved; lid obtuse; pedicel somewhat long. Stems sparingly divided, r. tufted; branches us. long and often loosed from stem, us. brown-red with golden glossy tops, r. green. Often growing together with *C. sarmentosum* or *Hypnum revolvens*. — Swamps in northern alps r. *Eur.* Norway fruiting! Sweden: R. Hartman. Finl.: Brothaus. *Amer.* Greenl.: Berggren.

9. *C. polare* Lindberg. — *Hypnum* Lindberg.

Leaves ovate-oblong, either obtusate (obtuse or acute) or short-acuminate and falcate, greenish or sometimes golden glossy; alar cells large hyaline, the others sublinear or the uppermost oblong-lanceolate; costa subpercurrent. Capsule slightly curved not large; pedicel short. Stems densely tufted but loosely cohering; branches sometimes subjulaceous. — Sand and stones in alp. rivulets r. *Eur.* Norway! Sweden fruiting: E. Nyman. Spetsbergen: Berggren. France: Husnot. *Amer.* »Greenl.«: Berggren.

2. *Ochraceiformia*.

A. Leaves entire; costa gen. short us. double. Stem not rigid; branches often long.

10. *C. ochraceum* Turner et Wilson. — *Hypnum* T. et W.

Stem-leaves broad-ovate obtuse not falcate; uppermost cells

oblong-lanceolate, middle sublinear, alar large. Branch-leaves often curved and acute, sometimes sinuate near apex. Capsule subovate or arcuate; lid obtuse; pedicel not long. Leaves often large, us. green or ochraceous. — Stones in running water princ. in northern alps. *Eur.* not r. Norway *Guttsjon*, Sweden! Spain: *Levier.* *Amer.* Alaska: J. M. Macoun. *Can.* not r.: Macoun, fruiting; Moser; Waghorne.

11. *C. Goulardi* Schimper. — *Hypnum* Sch.

Leaves small not falcate, broadly subcordate *obtuse* very concave; cells suboblong or oblong-lanceolate *exc. the small* alar. Capsule very small, faintly curved; lid obtuse; pedicel short. Tufts dark green. Branches often very long. — Earth and stones in upper alp. region r. *Eur.* Norway (fruiting)! Sweden: E. Nyman. Austria: Breidler. *Amer.* *Can.*: Macoun. Greenl.: Berggren.

B. Leaves crenulate all around; costa subpercurrent. Stem rigid when dry; branches not long.

12. *C. torrentis* C. M. et Kindb. — *Hypnum* cat. *Can.* m.

Leaves smaller than in the last, subcircular not falcate, recurved below; cells as in the last. Capsules unknown. Stem filiform. — Rocks in mountain torrents r. *Amer.* *Can.* Rocky mts: Macoun.

3. *Molliformia*.

A. Monoecious often fruiting. Leaves us. denticulate above. Stem eradiculose.

a. Alar leaf-cells large, in elder leaves finally red.

13. *C. eugyrium* Schimper. — *Hypnum* Sch.; *H. subeugyrium* Renauld et Cardot ?

Leaves ovate-oblong either obtusate (obtuse and cucullate at apex or acute) or short-acuminate, entire or near apex faintly denticulate; cells gen. sublinear *exc. the alar*; costa us. double. Capsule subobovate or slightly curved; lid obtuse; pedicel not long. Tufts us. brownish with golden glossy branch-tops, sometimes green. — Rocks in running water or near lakes gen. r. *Eur.* Germany! Sweden: C. Hartman. Engl.: Rogers. *Amer.* *Can.*: Macoun; Moser; Waghorne.

b. Alar leaf-cells small nearly indistinct; the inner dilated. Stem rigid at least when dry.

14. *C. cartilagineum* Sommerfelt. — *Hypnum* Somf.

Leaves subcircular obtuse entire or very faintly sinuate above, crowded, small or large; inner cells oval-oblong; costa us. double. Capsule small faintly curved; segments not split;

lid obtuse; pedicel not long. Tufts dense dark green or blackish. Branches not long. — Stones in alp. rivulets gen. r. *Eur.* Norway! *Amer.* r. Can.: Macoun.

c. Alar leaf-cells not red, gen. distinct; the inner sublinear. Stem soft.

15. *C. molle* Dickson. — *Hypnum* Dicks.; *H. dilatatum* Wilson; *H. alpinum* Schimper.

Leaves subcircular or oval-ovate with contracted base, obtuse or short-apiculate, crenulate or sinuate above, crowded; alar cells gen. small; costa us. double. Capsule arcuate; lid obtuse or apiculate; pedicel short. Tufts dense brown or brownish green often with golden glossy branch-tops. Stem sometimes denudate below; branches more or less turgid. — Wet alp. rocks. *Eur.* not r. Norway! *Amer.* r. Can.: Macoun.

16. *C. alpestre* Swartz. — *Hypnum* Sw.

Leaves entire suboblong, narrower than in the last and less patent when moist, crowded, either obtusate apiculate or short-acuminate acute; alar cells often large, sometimes orange-colored; costa often simple. Capsule as in the last but often with longer pedicel. Habit of the last. — Wet rocks in northern alps r. *Eur.* Norway! *Amer.* Can.: Macoun. Greenl.: Berggren.

17. *C. columbico-palustre* C. M. et Kindb. — *Hypnum* cat. Can. m.

Leaves suboblong denticulate above middle, crowded; alar cells large; costa simple, reaching above middle. Capsule arcuate; lid flat mamillate; pedicel somewhat long. Tufts green or golden glossy. — Wet rocks r. *Amer.* Can. Brit. Col.: Macoun.

18. *C. circulifolium* C. M. et Kindb. — *Hypnum* cat. Can. m.

Leaves subreniform or subcircular with cordate base, faintly crenulate all around, distant and green; cells and costa as in *C. molle*. Capsules unknown. — Rocks below alps r. *Amer.* Can. N. Brunswick: Moser.

B. Dioecious very r. fruiting. Leaves us. entire; alar cells very small or indistinct. Stem often simple.

a. Stem julaceous eradiculose. Leaves entire obtusate crowded; costa short.

19. *C. turgescens* T. Jensen. — *Hypnum* T. Jens. 1858.

Leaves large ovate or broad-ovate obtuse, sometimes short-apiculate, brown or green, nearly appressed when dry; cells oblong-lanceolate, the alar indistinct; costa double. Stem thick very turgid not rigid. Swamps in alps or heaths (in Sweden)

below alps r. *Eur.* Sweden, Norway! *Amer.* Can. Macoun. Greenl.: Berggren.

20. *C. trifarium* Weber et Mohr. — Hypnum W. M.

Leaves somewhat small, broad-ovate or subcircular, obtuse or subacute, brownish, strongly appressed when dry; lower basal cells short dilated, the others sublinear; costa sometimes simple. Capsule small suboblong or faintly curved; lid convex short-apiculate. Stems (branches) gen. very long and not tufted, not thick but very rigid when dry. Resembles *C. stramineum* — Peat-bogs r. *Eur.* Norway! Sweden: R. Hartman; O. W. Redelius. *Amer.* Can. fruiting: Macoun.

b. Stem not julaceous, sparingly radiculose. Leaves faintly denticulate above, short-acuminate somewhat distant; costa sometimes prolonged and simple.

21. *C. submolle* Kindb. — Limnobion rev. bryol. 1895.

Leaves with subovate base, sometimes acute, not falcate; cells linear, alar nearly indistinct. Tufts loose brown. Capsules unknown. — Rivulets in higher alp. region r. *Eur.* Norway in Snehetten: Dr P. Olsson.

4. Montaniformia.

A. Dioecious. Capsules unknown. Leaves dentate-serrulate.

22. *C. micans* Wilson. — Hypnum Wils.; Chrysobryum Lindb.; Sulliv. icon. muse.

Leaves broad-ovate or subcircular obtuse or acute, sometimes short-acuminate, recurved below, serrulate to below middle, not or slightly curved, subdecurrent, crowded or subdistant; cells gen. suboblong, inner basal yellow; costa gen. short and double. Tufts brown with golden glossy branch-tops. — Wet rocks r. *Eur.* Irel.: G. A. Holt. *Amer.* »U. S.«: Sulliv.

B. Monoecious. Capsule small subovate or arcuate; lid obtuse; pedicel short.

a. Leaves crowded, not or indistinctly decurrent, denticulate at least above middle; costa us. short and double.

23. *C. pseud-arcticum* Kindb. — Hypnum cat. Can. m.

Leaves broad-oval or subcircular gen. obtuse, denticulate above middle, us. not distinctly falcate when moist; cells sublinear-lanceolate except the hyaline alar. Tufts brown with green or glossy green branch-tops. Resembles a small variety of *C. palustre*, which differs in entire leaves and not annulate capsule. — Wet stones in subalp. region r. *Amer.* Can. Brit. Col.: Macoun.

24. *C. montanum* Wilson. — Hypnum Wils.

Leaves subovate acute apiculate or short-acuminate, denticulate

all around, falcate or incurved; cells oblong-lanceolate except the often yellow alar. Tufts bright green or brown with green branch-tops. — Stones in rivulets r. *Eur.* Norway: Kaurin; E. Nyman. *Amer. Can.*: Macoun; Waghorne. U. S.: Roell; James, com. Levier.

b. Leaves distant decurrent nearly entire; cells oblong-lanceolate; costa often simple.

25. *C. pseudo-montanum* Kindb. — Hypnum cat. Can. m.

Leaves subovate-oblong often somewhat long-acuminate, acute or obtuse, denticulate at apex, falcate or incurved, larger than in the last; alar cells more distinct; costa simple reaching above middle. Tufts bright green. Habit of the last, but branches are longer. — Stones in rivulets r. *Amer. Can.*: J. Macoun; Waghorne; Drummond n. 206 in part. Alaska: J. M. Macoun. **26. *C. viridulum*** Hartman. — Hypnum Hartm. skand. flora; *H. norvegicum* Schimper.

Leaves broad-ovate obtuse entire or slightly sinuate at apex, not distinctly falcate; alar cells hyaline; costa simple or double. Tufts green. Resembles a small *C. ochraceum*. — Alp. rivulets r. *Eur.* Norway!; J. E. Zetterstedt; Kaurin (fruiting). *Amer.* U. S. Oregon, mount Hood: Roell.

56. *Camptothecium* Bryol. eur., in part.

A. Stem us. brown-tomentose.

1. *Tomentella*. Capsule large; lid not rostrate; pedicel long smooth. Leaves entire gen. large. Stem not regularly pinnate, not creeping; branches straight not julaceous, often distant. Tufts yellowish or golden glossy, r. green or brown. Dioecious.

B. Stem not tomentose but sometimes radiculose.

a. Stem us. irregularly divided; branches somewhat long and distant, not julaceous, often straight. Dioecious or monoecious.

2. *Luteolaria*. Capsule large; lid us. rostrate; pedicel long sometimes smooth. Leaves large and narrow; those of branches us. denticulate. Stem often nearly eradiculose. Tufts glossy yellowish or greenish.

b. Stem us. pinnate; branches gen. short and crowded, subjulaceous or julaceous, us. curved. Pedicel of capsule rough; lid not rostrate. Gen. dioecious.

3. *Sericaria*. Capsule large; pedicel not long. Leaves us. large, those of branches denticulate. Stem rigid us. creeping. Tufts us. green and silky glossy.

4. *Aureolaria*. Capsule small; pedicel short. Leaves small, those of branches often nearly entire. Stem not rigid, often not creeping. Tufts us. golden glossy.

1. *Tomentella*.

1.C.*nitens* Schreber. — Hypnum Schr.; Camptothecium Schimper.

Leaves narrowly triangular (subovate-lanceolate) gradually long-acuminate filiform-pointed, not decurrent; alar cells very small, the others linear; alar and lower basal cells brown; costa reaching to acumen. Capsule oblong or subcylindric finally arcuate; teeth yellow; lid apiculate. Tufts us. yellowish or golden glossy. — Swamps and peat-bogs. *Eur.* common in northern districts. Sweden, Norway! *Amer.* not common. Can.: Macoun; Waghorne.

In var. *atrichum* Kindb., a princ. arctic plant, tufts are us. brown, stems without tomentum. Capsules unknown. — *Eur.* Norway near Kongsvold! Spetsbergen; R. Gyllencreutz.

2. *Luteolaria*.

A. All leaves subulate-acuminate; inner cells linear. Stem-leaves gen. entire.

a. Leaves plicate not or shortly decurrent; alar cells small.

2.C.*lutescens* Hudson. — Hypnum Huds.; Camptothecium Br. eur.; C. *fallax* Philibert; C. *fulgens* Mitten.

Leaves narrow-triangular gen. long-acuminate, not decurrent; apical cells of uppermost branch-leaves sometimes oblong, alar not well-distinct, the others gen. linear; costa reaching to acumen. Stem-leaves entire; branch-leaves narrower, faintly denticulate at acumen and near base, the uppermost often shorter and serrate above. Perichetial leaves variable, gradually or abruptly narrowed. Capsule more or less oblique often arcuate; teeth yellow; endostome variable often not well-evolute; pedicel rough. Often pseudo-monoecious. Tufts us. yellowish or green-yellow. Branches gen. straight. Dioecious. — On rocks and earth or on base of trees. *Eur.* not r. Sweden, Switzerland! *Amer.* Pacif. distr. r. Can.: Macoun. U. S.: Roell, com. Cardot.

*C.*aeneum* Mitten. — Hypnum Mitt.; Camptothecium Kindb.; Homalothecium subsericeum C. M.

Leaves gen. shorter acuminate short-subulate, us. golden glossy; those of branches more distinctly denticulate. Capsule shorter-pedicellate; teeth dark yellow; endostome more evolute; cilia sometimes appendiculate. Branches often curved. *Amer.* Pacif. distr. r. Can.: Macoun. U. S. Henderson, com. Cardot.

3.C.*nevadense* Lesquereux. — Hypnum Lq.; Camptothecium Kindb.

Differs from C. *lutescens*: Leaves gradually short-acuminate, gen. larger; costa longer, vanishing in acumen. Peristomial

teeth orange. — Rocks r. *Amer.* Pacif. distr. Can. Brit. Col.: Macoun.

4. *C. oxyeladon* Bridel. — Hypnum Brid.; C. M. syn.; Campothecium Kindb.

Leaves long-acuminate subulate filiform-pointed short-decurrent, entire or at acumen faintly sinuate; alar cells hyaline; costa reaching to acumen or shorter. Branches compressed not curved. Tufts green silky glossy. »Capsule oval symmetric inclined; lid obtuse; pedicel smooth. Monoecious»: C. M. syn. — *Amer.* r. Can: Macoun.

5. *C. Philippii* Spruce. — Isothecium Spr.; Campothecium Kindb.; Homalothecium Br. eur.

Leaves narrow-triangular long-acuminate, more or less decurrent and auricled. Stem-leaves entire; costa long-excurrent. Branch-leaves faintly denticulate above, often also near base; costa vanishing in acumen. Perichetial leaves us. abruptly narrowed to a long subfiliform point. Capsule subcylindric-oblong straight symmetric; teeth yellow; endostome not well-evolute; pedicel smooth or in lower part faintly rough. Tufts us. green and silky glossy, gen. very dense. Branches straight or slightly curved. Dioecious. — Calcareous rocks gen. r. *Eur.* Switzerl. Austria: Venturi. France: Schimper; Husnot. Germany: com. Warnstorf.

b. Leaves plicate long-decurrent; alar cells very large, hyaline or reddish.

6. *C. lamprochryseum* C. M. et Kindb. — Brachythecium cat. Can. m.

Leaves gradually narrowed to a short narrowly subulate or filiform often curved point, strongly plicate. Stem-leaves gen. entire; costa vanishing near middle. Branch-leaves faintly denticulate all around; acumen longer, costa often reaching to it. Capsule subovoid or arcuate; teeth yellowish or in lower part brown; endostome well-evolute; cilia not appendiculate; lid not seen; pedicel very rough, often long. Tufts us. golden yellow shining. Stem subpinnate; branches straight. Monoecious. Resembles somewhat *C. lutescens* and *Brachythecium rivulare*. — Mountain torrents and marshes r. *Amer.* Pacif. distr. Can.: J. and J. M. Macoun.

c. Leaves faintly striate decurrent; lower basal cells nearly uniform not large, alar not well-defined. Stem us. creeping.

7. *C. acuminatum* Hedwig. — Leskea H.; Campothecium Kindb.; Homalothecium Ren. et Card.; »Hypnum Beauvois»: Sulliv. ic. m.

Leaves crowded with subulate gen. not long acumen, entire and recurved below, above middle us. faintly denticulate; middle and upper cells linear; costa often reaching in acumen. Stem-leaves subovate-oblong less distinctly triangular; branch-leaves subtriangular ovate-lanceolate. Perichetial leaves long-triangular filiform-pointed. Capsule us. cylindric straight; cilia rudimentary; segments not well-evolute; annulus none; lid long-conic acute; pedicel not long. Tufts compact us. green silky glossy. Stem creeping; branches subjulaceous often sciuroid-curved. Dioecious but often fruiting. — Trees and rocks, sometimes in water. *Amer.* not r. *Can.*: Macoun. *U. S.*: Sullivant, com. *C. Mueller.*

* **C. stenocarpum** (Ren. et Card., as var.) Kindb. (in Hedwigia 1896).

Capsule narrower; lid from convex base abruptly rostellate. Leaves distinctly denticulate nearly all around. — *Amer.* r. *U. S.* Wisconsin: Roell.

C. spurio-acuminatum C. M. et Kindb. — *Brachythecium* cat. *Can.* m.

Differs from *C. acuminatum*: Capsule curved; endostome well-evolute; cilia long. Leaves distinctly denticulate all around. Perichetial leaves subulate-acuminate. Tufts loose sparingly radiculose. Monoecious. — Logs r. *Amer.* *Can.*: Macoun.

B. Branch-leaves obtusate obtuse; apical cells suboblong, lower oblong-lanceolate. Stem-leaves also denticulate.

C. alsioides Kindb. in Pittonia 1892.

Leaves indistinctly decurrent; costa reaching to acumen or in branch-leaves shorter. Stem-leaves broadly ovate-lanceolate, attenuate to a short acute or subulate acumen, faintly denticulate above middle, more distinctly serrulate at acumen; alar cells quadrate numerous, the others sublinear. Branch-leaves narrower, more sharply serrate above. Perichetial leaves abruptly narrowed to a long subuliform denticulate often deflexed acumen. Capsule subcylindric curved; teeth orange; segments yellow, lacunose in middle; cilia not appendiculate; lid flat apiculate; pedicel rough about 16 centim. long. Tufts bright green glossy. Stem curved pinnate; branches obtuse often curved when dry. Dioecious. — Rocks p. *Amer.* California: Marshall A. Howe.

3. Sericaria.

A. Capsule us. straight symmetric; segments short; cilia none. Stem-leaves somewhat long-decurrent, us. diversiform; alar cells few.

10.C.sericeum L. — Hypnum L.; Camptothecium Kindb.; Homalothecium Br. eur.

Stem-leaves gen. entire, the elder short; costa reaching to acumen. Branch-leaves longer and narrower, denticulate above middle, often also at basal angles; costa longer, not percurrent. Capsule ovate-oblong or subcylindric; teeth pale yellow; annulus revoluble; lid often apiculate. Stem rigid pinnate. Tufts us. green and silky glossy. — Male plant much smaller; leaves smaller and narrower, those of stem often dentate below, those of branches with long subfiliform point — Trees and stone. *Eur.* common. Sweden, Switzerl. *Amer.* r. U. S. Calif.: Mrs L. C. Feely. Can.: Macoun.

B. Capsule asymmetric or curved; segments long; cilia present. Stem-leaves short-decurrent; alar cells numerous.

11.C.Gehebel Milde. — Hypnum Milde; Camptothecium Kindb.; Brachythecium Schimper.

Leaves subovate-oblong, those of stem entire, those of branches denticulate at acumen; costa vanishing in acumen. Capsule suboval; teeth orange; cilia short; annulus persistent; lid long-conic; pedicel 1 c. m. long. Stem pinnate. Tufts dusky green. — Dry princ. basaltic rocks r. *Eur.* Germany: A. Geheeb.

12.C.Amesiae Renaud et Cardot. — C. dolosum R. C.?

Differs from the last: Uppermost branch-leaves serrate at acumen with oblong cells above costa. Capsule oval-oblong or narrower; cilia long; lid short conic. Tufts silky glossy brown-green. — Rocks r. *Amer.* *Pacif.* distr. Can.: Macoun. U. S.: Henderson, com. Cardot.

4. Aureolaria.

A. Leaves decurrent, those of stem entire, those of branches sinuate or serrate above. Stem with none or few rhizoids.

a. Leaves small not long. Capsule oblong; teeth orange; segments and cilia long.

13.C.aureum Lagasca. — Hypnum Lag.; Camptothecium Br. eur.

Leaves gen. subovate-oblong entire, slightly recurved; cells linear exc. the alar. Branch-leaves sometimes faintly sinuate at acumen. Perichetial leaves entire gen. short-acuminate. Capsule nearly straight; lid apiculate. Stem sometimes with paraphyllia. Tufts golden glossy. — Stones r. *Eur.* *Mediterran* distr. Greece: Orphanides, com. Heldreich. France: Philibert.

14.C.pinnatifidum Sullivant et Lesquereux; Sull. ic. m.

Differs from the last: Inner leaf-cells lanceolate-linear.

Perichetial leaves long-acuminate with filiform point. Capsule curved; lid mamillate. — Shaded rocks r. *Amer.* Pacif. distr. Can.: Macoun; Roell. U. S.: Bolander, com. C. Mueller.

15. *C. arenarium* Lesquereux.

Differs from *C. aureum*: Stem-leaves more distinctly recurved; branch-leaves serrate above. Branches less crowded us. straight. Tufts dirty yellowish. — Sandy ground r. *Amer.* Pacif. distr. Can.: Macoun. U. S.: Bolander, com. C. Mueller and Renauld.

b. Leaves long narrow somewhat large. Capsules unknown.

16. *C. sericeoides* C. M. et Kindb. cat. Canad. m.

Leaves long-acuminate subulate; those of branches denticulate at acumen, entire below; inner cells linear. Perichetial leaves serrate to below middle, gradually acuminate subulate. Stem not creeping; branches curved. — Rocks r. *Amer.* Can. Brit. Col.: Macoun.

B. Leaves small and, at least on those of branches, denticulate gen. all around. Branches crowded and us. curved.

a. Leaves long narrow gradually long-acuminate. Stem pinnate.

17. *C. Nuttallii* Wilson. — Hypnum Wils.; Sull. ic. musc.; Camptothecium Schimper.

Leaves subulate-acuminate decurrent, broadly recurved often to middle, minutely serrulate above to below middle, stronger dentate at base; inner cells linear. Capsule narrowly ovate-oblong, slightly curved; teeth orange; segments long or short; cilia rudimentary; lid apiculate or rostellate. Stem us. creeping; branches short. Tufts us. golden glossy. Sometimes pseudo-monoecious. — On trees and logs, r. on rocks. *Amer.* Pacif. distr. r. Can.: Macoun Canad. musci n. 280. U. S.: Roell; Bolander, com. Renauld.

18. *C. hamatidens* Kindb. bull. Torr. club XVI.

Differs from the last: Leaves sharply hooked-dentate at base and at acumen, nearly entire in middle. Capsule subovate; segments long split in two divergent legs; cilia distinct. Stem nearly eradiculose with often long branches. Tufts often green and silky glossy. — On rocks r. on trees. *Amer.* Pacif. distr. less r. Can.: Macoun. U. S.: Roell and Miss Mann, com. Cardot.

b. Leaves short and broad.

aa. Stem pinnate radiculose.

19. *C. leucodontoides* Kindb. revue bryol. 1895.

Stem-leaves from short-triangular (subcordate or broad-ovate) base abruptly narrowed to a long falcate subulate filiform-



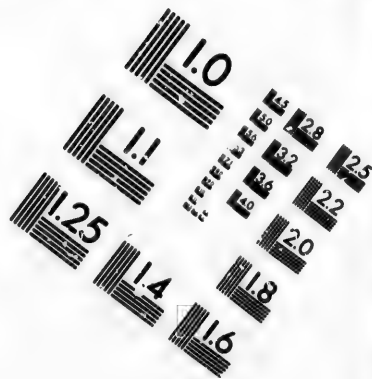
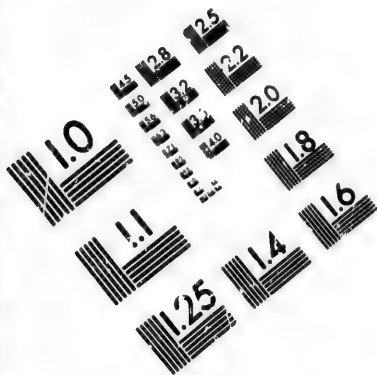
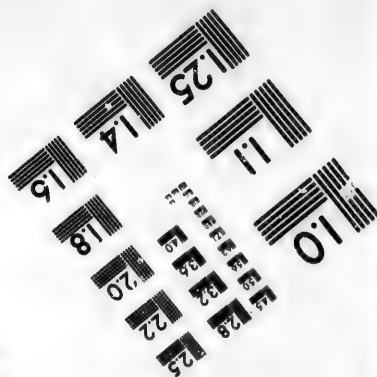
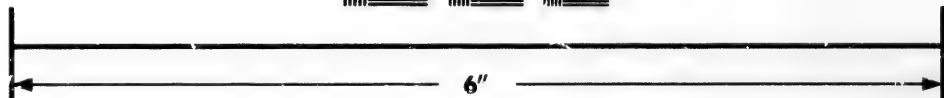
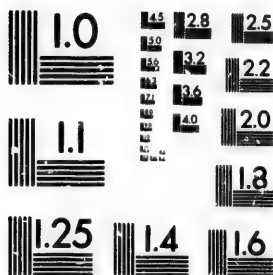


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pointed acumen, minutely denticulate above to below middle, stronger serrate at base, broadly recurved only near base, long-decurrent; alar cells hyaline very numerous, the others linear; costa reaching to acumen. Branch-leaves ovate-oblong subtriangular acute or short-acuminate, minutely denticulate but near apex serrate, recurved all around; apical cells oblong. Capsules unknown. Stem creeping, rigid when dry; branches brown-yellowish golden glossy. Dioecious. — *Amer.* r. U. S. California: Mrs L. C. Feely 1882.

20. C. corticola Kindb. — *Homalothecium* bull. Torr. club XVII.

Stem-leaves ovate-triangular with long filiform point, denticulate at base, sinuolate or nearly entire above, not or near base slightly recurved, indistinctly decurrent; alar cells few not hyaline, the others linear-lanceolate; costa reaching to the point. Branch-leaves subtriangular or broadly ovate-oblong, short-acuminate acute minutely denticulate, recurved to acumen; upper cells rhomboidal or oval-oblong; costa shorter. Capsule oblong-cylindric straight or slightly curved; teeth orange; segments long split; cilia none; annulus broad; lid short-pointed; pedicel short faintly rough. Branches subulaceous. Tufts green compact. Monoecious or pseudo-monoecious. Habit of *Pylaisia intricata*. — On bark of trees r. *Amer.* Pacif. distr. Can.: Macoun.

bb. Stem eradiculose, irregularly divided.

21. C. aureolum Kindb. revue bryol. 1895.

Leaves small not decurrent, minutely denticulate all around, short-triangular subovate-oblong (or on branches broadly ovate-lanceolate) with subulate not long acumen; alar cells few, the others lanceolate-linear; costa vanishing below acumen. Capsules unknown. Tufts golden glossy. Branches curved. Habit of *C. aureum*. Dioecious. — Rocks r. *Eur.* Norway: E. Nyman; C. Kaurin. U. S. Pacif. distr.: Roell, com. Cardot («*Homalothecium nevadense* var. *subulatum*» Cardot).

57. **Eurhynchium** Bryol. eur., in part.

A. Leaves very distinctly mamillöse (subpapillose).

I. Scabridaria. Lid of capsule gen. not rostrate; pedicel rough. Leaves decurrent, serrate or serrulate all around gen. not large. Stem us. pinnate; branches not compressed. Us. dioecious.

B. Leaves, princ. the uppermost on branches, faintly mamillöse near apex.

a. Pedicel of capsule (exc. *E. tenellum* and *E. labradoricum*) smooth.

aa. Alar leaf-cells us. distinct.

II. **Stokesiella**. Lid of capsule rostrate. Leaves us. distant and decurrent. Mostly dioecious.

1. **Prælonga**. Leaves not appressed. Stem us. pinnate.

2. **Velutinoidea**. Leaves appressed when dry. Stem not pinnate.

III. **Illecebrina**. Lid of capsule not rostrate. Leaves large crowded not decurrent, appressed when dry. Stem irregularly divided. Mostly dioecious.

IV. **Starkeella**. Lid of capsule not rostrate. Leaves decurrent gen. nearly crowded, us. small and not distinctly appressed when dry. Stem gen. subpinnate. Mostly monoecious.

bb. Alar leaf-cells not distinct.

V. **Rhynchostegiella**. Lid of capsule us. rostrate. Leaves more or less distant, not distinctly decurrent and not appressed, very small. Stem not pinnate. Monoecious.

b. Pedicel of capsule smooth or (sometimes in *E. collinum*) indistinctly rough. Alar leaf-cells gen. distinct.

VI. **Leiopodium**. Mostly monoecious.

1. **Muraliformia**. Lid of capsule rostrate. Leaves gen. large. Stem us. irregularly divided. Monoecious.

2. **Strigosiformia**. Lid rostrate. Leaves us. small, those of branches often obtuse. Stem mostly pinnate. Us. dioecious.

3. **Colliniformia**. Lid not rostrate. Leaves us. small. Stem us. not pinnate. Mostly monoecious.

I. *Scabridaria* Kindb.

A. Leaves serrate all around, those of branches small narrow gradually acuminate. Stem thin not rigid.

1. **E. graminicolor** Bridel. — *Hypnum* Brid.; *Eurhynchium* Renauld et Cardot; *Hypnum Sullivantii* Spruce; Sull. ic. m.

Leaves ovate-oblong or broadly ovate-lanceolate with subulate gen. shortish point, not striate, slightly recurved, patent or spreading when dry; cells sublinear or lanceolate exc. the alar; costa vanishing near acumen. Perichetial leaves filiform-pointed. Capsule suboval; lid long-conic apiculate or rostellate; pedicel not long. Tufts intricate green not glossy. Stem irregularly divided; branches short distant. Habit of *E. prælongum*. Dioecious r. fruiting. — On earth r. *Amer. Can.*: Macoun; Moser. U. S.: Roell.

2. **E. subscabridum** Kindb. note on *Canad. bryol.* 1893.

Differs from the last: Stems subulaceous; branches attenuate longish nearly crowded. Leaves shorter, more concave and longer decurrent; alar cells more numerous. Stem-leaves ovate

filiform-pointed; branch-leaves ovate-oblong long-acuminate. Tufts pale green. Sometimes pseudo-monoecious. Capsules unknown.

— Limestone rocks r. *Amer. Can.*: Macoun; Waghorne.

B. Leaves serrate all around broad and somewhat large sub-obtusate or abruptly short-acuminate. Stem thick rigid.

3. ***E. scabridum*** Lindberg in litt. — Bryhnia Kaurin.

Leaves short acute faintly striate strongly mamilllose, long-decurrent recurved near base; alar cells somewhat numerous, the others sublinear-lanceolate; costa vanishing near middle or shorter. Stem-leaves ovate; branch-leaves ovate-oblong. Capsule suboval; lid long-conic. Tufts dark green. Stem decumbent gen. irregularly divided; branches short obtuse distant straight often subjulaceous. Dioecious. — Earth r. *Eur. Norway*: N. Bryhn; E. Nyman.

C. Leaves serrulate at the subulate shortish point, broad and somewhat large. Stem thick rigid.

4. ***E. Novæ Angliæ*** Sullivant et Lesquereux. — Hypnum S. L.; Sull. ic. m.; Eurhynchium Kindb.; Hypnum Lq. et Jam.

Leaves not striate, nearly appressed when dry and not recurved, from gen. broad-ovate base abruptly acuminate; alar cells subquadrate, the others lower suboval, the upper oblong-lanceolate; costa vanishing below acumen. Capsule oblong or curved; lid long-conic sometimes rostellate; pedicel not long. Tufts somewhat loose, brownish or yellowish at least below, often pale green above. Stem ascending subpinnate; branches gen. straight and short. Dioecious. — Wet rocks r. *Amer. Can.*: Moser. U. S.: Austin, com. Macoun; Sullivant et Lesq., com. Cardot.

5. ***E. chloropterum*** C. M. et Kindb. — Hypnum cat. Can. m.

Differs from the last: Leaves striate not appressed, often recurved to middle, less abruptly narrowed, glaucous green and longer decurrent; upper cells sublinear; costa shorter, vanishing near middle. Branches often fasciculate in upper part of stem, us. curved. Sometimes monoecious. Resembles somewhat *Hypnum decipiens* or a *Thuidium* in habit. — Wet earth and rocks r. *Amer. Can. N. Brunswick*: Moser; N. Foundl. common: Waghorne.

II. *Stokesiella* Kindb.

1. *Prælonga*.

A. Leaves denticulate all around.

a. Leaves long-acuminate; those of stem very broad at base, long-decurrent; angular cells numerous, special alar large.

6. **E. Stokesii** Turner. — Hypnum Turn.; Eurhynchium Br. eur.

Leaves serrulate striate with narrowly subulate acumen; cells gen. linear exc. the angular; costa vanishing in acumen. Leaves of the thicker stem broad-ovate often filiform-pointed; those of branches ovate or ovate-oblong; those of the complanate branchlets very small and narrow. Capsule strangulate suboval or curved; pedicel often long. Tufts us. green. Stem us. ascending, sometimes with paraphyllia; branches thin often fasciculate. R. fruiting. — On earth and stones or at base of trees. *Eur.* princ. in southern distr. Germany, Italy! Sweden: Lindb. g. *Amer.* common in Pacif. distr. Can.: Macoun. U. S.: Mrs L. C. Feely; Henderson, com. Cardot.

* **E. pseudo-speciosum** Kindb. n. subsp.

Leaves squarrose; costa vanishing below acumen. Stem creeping. Capsules unknown. — Wet places r. *Amer.* Alaska: J. M. Macoun. *Eur.* Sweden: J. Persson.

7. **E. oreganum** Sullivant. — Hypnum Sull.; Eurhynchium Kindb.

Differs from *E. Stokesii*: Leaves larger, minutely denticulate, less distant or nearly crowded. Capsule not distinctly constricted. Tufts looser, finally yellowish. Stem decumbent more rigid; primary branches thick often plumiform; branchlets not complanate. — Logs in woods r. *Amer.* Pacif. distr. Can.: Macoun; Dawson. U. S.: Hertzman, com. E. Nyman; Henderson, com. Cardot.

b. Leaves not much broad at base, gen. not or slightly decurrent, with a not long acumen; angular (alar) cells few. Stem decumbent; branches often complanate.

aa. Leaves large serrulate gen. distinctly decurrent. Sometimes synoecious.

8. **E. speciosum** Bridel. — Hypnum Brid.; Eurhynchium Milde; Hypnum Starkii C. M. syn.

Leaves short-acuminate subovate or (those of branches) ovate-oblong, faintly striate, very chlorophyllose, distant; cells sublinear exc. the alar; costa vanishing below acumen. Capsule oval-oblong; pedicel long. Stem creeping somewhat thick. Tufts green often glossy. — Humid stones and earth in woods. *Eur.* not r. in south, distr. Switzerl., Germany!

bb. Leaves not large, gen. minutely denticulate; those of branches not distinctly decurrent.

9. **E. praelongum** L. — Hypnum H.; Eurhynchium Br. eur.; Hypnum distans Lindb.; H. hians Sull. ic. m.

Leaves distant gen. subovate subobtusate and not striate; cells us. oblong-lanceolate; costa vanishing below acumen.

Capsule oval-oblong; pedicel sometimes long. Stem us. thin and eradiculose with distant branches. Tufts greenish us. loose and not glossy. — On earth and logs, less often on rocks. *Eur.* common. Sweden, Germany, Switzerl., Italy! *Amer.* less common. Can.: Macoun; Moser; Waghorne. U. S.: Langlois, com. Cardot. Greenl.: Wenck, com. Roell.

* **E. Swartzii** Turner. — Hypnum Turn.; Lindb.; Eurhynchium Curnow.

Leaves broad ovate short-acuminate crowded; cells oblong-lanceolate. Stem thicker and somewhat rigid, sparingly radiculose; branches nearly crowded. Tufts dark green somewhat dense. — Shaded stones and logs in woods. *Eur.* not common. Sweden!; Lindberg.

* **E. Schleicheri** Hedw. fil. — Hypnum H. f.; Eurhynchium Lorentz.

Leaves ovate-lanceolate sometimes long-acuminate, us. crowded; cells sublinear, costa long often short-excurrent. Capsule and pedicel shorter. Tufts dense. — Rocks r. *Eur.* Sweden! Belgium: Roemer.

* **E. hians** Hedwig. — Hypnum H., not Sulliv.; Eurhynchium Kindb.

Leaves gen. ovate-lanceolate with longish filiform point; upper cells lanceolate. Capsule smaller; pedicel short. Stem creeping. — *Amer.* probably not r. Can.: Macoun; Moser. U. S.: Hall, com. Macoun.

10. **E. pumilum** Wilson. — Hypnum W.; Eurhynchium Schimp.

Leaves distant subdistichous very small subovate (or those of branches ovate-oblong) acute, neither striate nor decurrent; cells suboblong or broadly lanceolate exc. the not much distinct alar; costa vanishing near middle. Capsule small oval; pedicel short. Tufts dense green. Stem creeping subcapillary. Resembles a small var. of *E. praelongum*. — Earth and rocks r. *Eur.* Switzerl.

11. **E. ticinense** Kindb. bull. soc. bot. ital. 1895. — *E. Teesdalei* var., Kindb. revue bryol. 1892.

Leaves small subdistant or nearly crowded, ovate-oblong or broadly ovate-lanceolate, acute or short-acuminate, not decurrent; upper cells lanceolate-oblong, lower nearly uniform subquadrate; costa percurrent or subpercurrent, well-distinct. Stem thin sparingly radiculose, irregularly divided. Tufts compact green. Capsules and flowers unknown. Resembles *Eurhynchium Teesdalei*, which differs in opaque still smaller and narrower leaves.

— Stones and stonewalls r. *Eur.* Switzerl. near Lugano! Italy near Como!

B. Leaves (at least those of stem) entire below, distant, somewhat large. Stem decumbent; branches gen. not complanate.

a. Leaves decurrent.

12. *E. pseudo-velutinoides* Kindb. revue bryol. 1895.

Leaves subulate-acuminate filiform-pointed not or slightly striate, faintly reflexed near base; cells sublinear; costa short. Stem-leaves entire subovate or ovate-oblong; costa scarcely reaching to middle. Branch-leaves ovate-lanceolate denticulate all around; costa reaching somewhat above middle. Perichetial leaves with very long filiform point. Capsules not seen; pedicel rough. Tufts loose green. Stem not creeping. — On earth r. *Amer.* Can. Vanc. isl.: Macoun 1893.

b. Leaves not decurrent.

13. *E. scleropus* Br. eur.; Husnot muscol. gall.

Leaves ovate or ovate-oblong with short subulate point, serrate above, not recurved; upper and middle cells oval-oblong, the lower suboblong except the alar; costa vanishing above middle far below apex. Perichetial leaves with long filiform point. Capsule oval-oblong; pedicel not long. »Tufts yellowish or olive-green, nearly eradulose. Resembles *E. velutinoides* but differs from it in larger more distant not distinctly striate leaves, their cells wider.» Husnot l. c. — Rocks r. *Eur.* »Germany: Muehlenbeck»: Schimper.

14. *E. lentum* Mitten. — Hypnum Mitt.; Eurhynchium Kindb.

Leaves less large, pellucid not striate, nearly crowded. Stem-leaves entire subovate abruptly tapering to a somewhat long narrowly subulate point; cells linear exc. the small dusky at the insertion, the alar not distinct; costa vanishing near middle. Branch-leaves ovate-oblong recurved and entire to above middle, denticulate in upper part; upper cells oblong-lanceolate, the lower linear exc. the lowest basal; costa thicker below, vanishing above middle. Capsule oblong-cylindric subarcuate; lid not seen; pedicel short. Tufts yellowish green eradulose. Branches somewhat compressed. — Logs in woods r. *Amer.* Can. Vanc. isl.: Macoun Canad. musci n. 292, determined by Prof. C. Mueller.

2. Velutinoidea.

A. Leaves minutely denticulate all around.

15. *E. Dawsoni* Kindb. bull. Torr. club XVII.

Leaves decurrent nearly crowded, large. Stem-leaves from

subovate base somewhat long-acuminate, recurved below; upper cells lanceolate, the lower and the numerous angular rhomboidal-oblong, special alar not well-defined; costa vanishing in acumen or subpercurrent. Branch-leaves ovate-oblong short-acuminate. Capsules unknown. Tufts dense dirty green nearly eradiculose. — Logs and rocks r. *Amer. Can. Pacif. distr.*: Macoun.

B. Leaves nearly entire below middle.

16. **E. velutinoides** Bruch. — Hypnum Bruch; Eurhynchium Br. eur.; »Hypnum filiforme Lamarck»: C. M. syn.

Leaves with short subulate or filiform twisted point, recurved below middle, distant decurrent, somewhat large; cells lanceolate exc. the subquadrate near base, alar not well-defined; costa reaching to or in acumen. Stem-leaves ovate-oblong often entire; branch-leaves ovate-lanceolate more or less striate. Capsule oblong; pedicel short very rough. Tufts yellowish or green, silky glossy. Habit of *Brachythecium populeum* and *B. crassinervium*. — Trees and rocks r. *Eur. Switzerl.* Austria: Breidler. France: Anthouard, com. Berthoumieu.

17. **E. Villardi** Renau'd et Cardot. — Brachythecium R. et C.; Eurhynchium Kindb.

Differs from the last: Leaves less distant; cells linear-lanceolate except the few quadrate alar; costa not reaching to acumen. Capsules unknown; »pedicel rough; monoecious»: R. et C. — *Amer. r. U. S. Pacif. distr.* Roell; also com. Cardot.

III. *Illecebrina* C. Mueller (*Scleropodium* Schimper).

A. Leaves round-obtuse at apex (r. subapiculate), entire or at apex obsoletely crenulate. Stem eradiculose; branches often long. Very r. fruiting.

18. **E. obtusifolium** Drummond. — Hypnum Dr.; Eurhynchium Kindb.

Leaves suboval, the lower broader; apical cells oblong, alar hyaline somewhat large, the others narrow-linear; costa thick vanishing near apex. Tufts glossy green or finally brown. Habit of *E. rusciforme*. Dioecious. »Capsule oblong horizontal»: Lesq. et Jam. — Stones in brooks. *Amer. Pacif. distr.* not r. Can.: Macoun. U. S.: Roell, com. Cardot.

B. Leaves not arrounded at apex, more or less denticulate. Stem more or less radiculose; branches short.

a. Branch-leaves minutely denticulate. Dioecious.

19. **E. illecebrum** Beauvois. — Hypnum »Beauv.»: Lindb.; »Schwægrichen»: Schimp.; Eurhynchium Milde; Hypnum (*Scleropodium*) Ornellanum Molendo, Limpricht ?

Lower stem-leaves entire ovate abruptly short-acuminate. Upper stem-leaves subdenticulate narrowly ovate-oblong, gradually subulate-acuminate; branch-leaves shorter, ovate-oblong acute or subobtusate, sometimes with filiform point; upper cells rhombic-oblong, middle and lower lanceolate-linear, the not large angular hyaline subquadrate; costa stout but not long, vanishing near or above middle, sometimes forking. Perichetial leaves long-acuminate nearly entire. Capsule horizontal turgid oval-oblong faintly curved; lid apiculate or rostellate. Tufts green or golden glossy. Branches obtuse. — On rocks or stonewalls or on earth in grassy places r. *Eur.* Italy: Arcangeli. Greece: Heldreich. France: Husnot; Le Jolis. Germany: Roell. Engl.: Curnow. *Amer.* »U. S.»: Lesq. et Jam.

20. *E. caespitosum* Wilson. — *Hypnum* Wils.; *Eurhynchium* Milde.

Differs from the last: Stem-leaves entire, from subovate base tapering to a short subulate point. Branch-leaves subovate short-acuminate acute; costa thinner. Capsule suboblong nearly straight suberect; lid short-apiculate. Tufts green or dirty green. Branches attenuate. — Sandstone, willow-trees and humid earth r. *Eur.* Engl.: Wilson, com. Schimper. France: com. Husnot. *Amer.* Can.: Macoun.

21. *E. subcaespitosum* Kindb. revue bryol. 1895.

Differs from the both last: Leaves narrower, less crowded and not densely appressed; those of stem ovate-oblong often filiform-pointed; cells gen. linear exc. the dilated hyaline alar and lowest basal. Branch-leaves denticulate only in upper $\frac{1}{4}$. Tufts yellowish green faintly glossy. Capsules unknown. — Wet rocks r. *Amer.* Can. Vanc. isl.: Macoun 1893.

b. Branch-leaves sharply serrate near apex. Monoecious.

22. *E. Macounii* Kindb. revue bryol. 1895.

Stem-leaves ovate-oblong long-acuminate often filiform-pointed, denticulate at least at acumen. Branch-leaves subovate-lanceolate obtusate denticulate below; upper cells rhombic, alar hyaline subquadrate, the others sublinear-lanceolate; costa stout vanishing above middle. Perichetial leaves long-acuminate filiform-pointed denticulate above. Capsule narrow-cylindric suberect nearly straight; lid rostellate. Tufts golden glossy or green. Stem subpinnae; branches acute. — Logs and willow-trees r. *Amer.* Pacif. distr. Can.: Roell; Macoun Canad. musci 290 in part.

IV. *Starkeella* Kindb.

A. Leaves more or less striate or plicate. Monoecious.

a. Branch-leaves serrate. Pedicel rough. Leaves not plicate.
23. E. oedipodium Mitten. — Hypnum Mitt.; Eurhynchium Kindb.; Hypnum curtum Lindb.; Brachythecium Starkii Schimp. syn. in part; B. pseudo-Starkii Ren. et Card.

Leaves large gradually acuminate with sublinear or filiform often twisted point, long decurrent, more or less distant; alar cells large hyaline subquadrate not numerous; other cells lanceolate; costa not reaching to acumen, often very short. Stem-leaves subovate denticulate all around; branch-leaves from broadly ovate-oblong base tapering to a somewhat long acumen. Capsule large oval-oblong or arcuate; cilia appendiculate; lid rostellate or mamillate; pedicel long. Tufts loose green faintly glossy. — On earth in woods, probably not uncommon. *Eur.* Sweden!; S. O. Lindberg. *Amer. Can.*: Macoun; Moser; Waghorne. U. S.: Roell, com. Cardot.

24. E. trachypodium Funck. — Hypnum Funck; Eurhynchium Kindb.; Brachythecium Br. eur.

Leaves not large, not or shortly decurrent, distant or crowded; alar cells small gen. not much distinct; other cells gen. sublinear; costa vanishing near middle or shorter. Stem-leaves gen. ovate-oblong sometimes with long straight filiform point; branch-leaves narrower, gradually subulate. Perichetial leaves fimbriate. Capsule not large, oval-oblong not or slightly curved; cilia not appendiculate; pedicel short. Tufts dense or loose, often golden glossy. Stem creeping subpinnate. Resembles *Brachythecium velutinum*. — Caverns and crevices of alp. rocks r. *Eur.* Norway, Switzerl. *Amer. Greenl.*: Berggren.

* **E. Payoti** Schimper. — Brachythecium Sch.; Eurhynchium Kindb.

Leaves crowded; those of stem often abruptly narrowed to a curved filiform point. Capsules unknown. — In alps r. *Eur.* Mont Blanc: Payot, com. Husnot.

b. Branch-leaves minutely denticulate or nearly entire. Pedicel sometimes faintly rough or smooth. Leaves plicate nearly crowded.

25. E. glaciale Br. eur. — Brachythecium B. e.; Eurhynchium Kbg.

Leaves subovate with short subulate or filiform point, nearly appressed when dry; upper cells either linear-lanceolate or oblong-oval, lower basal suboval except the numerous subquadrate (green or hyaline) alar. Stem-leaves broad-ovate, sometimes long-decurrent and nearly entire; costa gen. vanishing in middle. Branch-leaves ovate denticulate all around; costa reaching to acumen.

Perichetial leaves erect. Capsule small suboval not curved; cilia not appendiculate; pedicel gen. short, us. faintly rough. Tufts dense green often not glossy. Stem subpinnate more or less radiculose. Leaves variable in size, sometimes nearly as small as in *E. reflexum*. — Earth near rivulets in higher alp. region r. *Eur.* Norway, Switzerl. *Amer.* Greenl.: Berggren.

26. *E. Roellii* Renauld et Cardot. — Brachythecium R. et C.; Eurhynchium Kindb.

Leaves subovate or ovate-oblong with somewhat short acumen, denticulate all around, less appressed; cells lanceolate exc. the few quadrate dusky alar; costa gen. not reaching to acumen. Capsules unknown. Stem eradiculose irregularly divided. Tufts dirty green. *Amer.* r. Can. Vanc. isl.: Roell, com. Cardot.

27. *E. labradoricum* Kindb. n. sp.; »*E. subglaciale*» in litt. ad Macoun.

Differs from *E. glaciale*: Leaves larger somewhat glossy, not appressed when dry; cells sublinear except the large not numerous alar; costa vanishing near middle. Stem-leaves gen. entire; branch-leaves long-acuminate minutely denticulate above. Perichetial leaves patent. Capsule curved; pedicel quite smooth, 3—4 c. m. long; lid acute; peristome not seen. — *Amer.* r. Can. Northern Labrador: Macoun 1896.

B. Leaves not striate. Capsule us. small; pedicel rough.

a. Branch-leaves serrate. Monoecious. Stem us. creeping.
28. *E. reflexum* Starke. — Hypnum St.; Eurhynchium Kindb.; Brachythecium Br. eur.

Leaves small and short with subfiliform or subulate gen. not long point; cells wide (as in *Amblystegium*): upper suboblong, the very numerous basal and angular larger, suboval or rotundate; special alar cells green few not well-defined; costa percurrent. Stem-leaves broadly round-ovate nearly entire, abruptly narrowed to the point. Branch-leaves ovate-oblong subulate-acuminate serrate all around. Capsule us. small suboval or arcuate; cilia appendiculate; lid apiculate; pedicel faintly rough, often not long. Tufts us. dense green. Stem rigid pinnate or bipinnate. — On rocks, earth and base of trees. *Eur.* not r. Sweden and Norway common! *Amer.* Can.: Macoun; Waghorne.
29. *E. pacificum* Kindb. n. sp. — Brachythecium reflexum var. *pacificum* Renauld et Cardot.

Differs from the last: Leaves larger and narrower with gen. long filiform point; cells oblong-lanceolate exc. the well-defined alar; costa abbreviate. Stem irregularly divided and not

rigid. Capsules not seen. — *Amer.* r. U. S. Pacif. distr.: Røell.

30. **E. Starkel** Bridel. — Hypnum Brid.; Lindb.; Eurhynchium Kindb.; Brachythecium Br. eur. in part.

Differs from the resembling *E. reflexum*: Leaves a little larger, distinctly denticulate all around, with short often twisted point; upper cells sublinear, lowest oblong-oval not numerous, alar quadrate hyaline well-defined; costa not percurrent, often vanishing below acumen. Tufts more dense. Stem irregularly divided or subpinnate. — Rocks r. *Eur.* Norway, Switzerl.! *Amer.* Can. Macoun; Waghorne.

b. Leaves minutely denticulate. Dioecious. Stem sparingly radiculose.

31. **E. Bolanderi** Lesquereux. — Hypnum Lesq.; Eurhynchium Kindb.

Leaves subdistichous very small, short-acuminate acute; cells gen. linear exc. the few quadrate alar. Stem-leaves ovate or ovate-oblong, sometimes filiform-pointed; costa vanishing near middle. Branch-leaves broadly ovate-lanceolate; costa vanishing above middle. Capsule suboval very small; lid subobtuse; pedicel short. Tufts brownish dense. Stem thin not rigid, irregularly divided. — Wet places in woods r. *Amer.* U. S. Pacif. distr.: Bolander, com. Renauld.

V. Rhynchostegiella Bruch et Schimper.

A. Pedicel of capsule smooth. Leaves not opaque and not much distant; costa well-defined. Tufts silky glossy. Us. fruiting.

32. **E. algerianum** Bridel. — Pterogynandrum Brid. 1798; Eurhynchium Kindb.; Hypnum tenellum Dickson 1801.

Leaves narrowly ovate-lanceolate gradually long-acuminate with filiform point, nearly entire; cells linear; costa reaching into acumen or shorter. Capsule oval; lid rostrate. — Crevices of gen. calcareous rocks and stone-walls. *Eur.* not r. in southern distr. Italy, Switzerl., Sweden!

B. Pedicel rough. Leaves opaque distant; costa gen. faint or not well-defined. Tufts not glossy. R. fruiting.

33. **E. Teesdalei** Smith. — Hypnum Sm.; Eurhynchium Schimp.

Leaves gen. broadly oblong-lanceolate and obtusate, denticulate nearly all around; cells lanceolate; costa gen. subpercurrent. Capsule oval-oblong; lid rostellate or apiculate. — Rocks near water r. *Eur.* Engl.: Holt; Rogers. Italy: Arcangeli.

* **E. Jacquini** Garovaglio. — Hypnum Gar.; Eurhynchium Kindb.; Rhynchostegiella Limpricht.

Leaves gen. narrower and acute or short-acuminate. — *Eur.*
r. Austria: Venturi. Sweden: E. Wetterhall.

34. **E. curvisetum** Bridel. — Hypnum Brid.; Eurhynchium Husnot.

Leaves oblong-lanceolate us. short-acuminate acute, nearly entire below middle; cells lanceolate; costa shortish. Capsule oval-oblong; lid rostrate. — Rocks r. *Eur.* Italy: Arcangeli. *Amer.* U. S.: James.

* **E. litoreum** Notaris. — Hypnum Not.; Eurhynchium Kindb., Rhynchostegiella Limpricht.

Leaves long-acuminate narrower. Lid of capsule rostellate. — Wet rocks r. *Eur.* Switzerl.! France: Husnot. Germany: Schimper.

VI. *Leiopodium* Kindb.

1. *Muraliformia*.

A. Leaves suboval-ovate obsoletely denticulate or entire; cells gen. lanceolate-oblong.

35. **E. murale** Necker. — Hypnum Neck.; Eurhynchium Milde; Rhynchostegium Br. eur.

Leaves obtusate (obtuse or short apiculate), nearly crowded; not decurrent; alar cells suboval; costa thin gen. not long, sometimes obsolete. Capsule oblong; pedicel short. Tufts green. Stem creeping; branches sometimes julaceous. — Stone-walls and rocks. *Eur.* Switzerl.! Sweden r.: S. Hardin; Berggren. Engl.: Cash. France: Husnot.

B. Leaves ovate or ovate-oblong denticulate; cells gen. linear.

a. Leaves not decurrent. Pedicel short.

36. **E. ruscifforme** Weis. — Hypnum Weis; Eurhynchium Milde; Rhynchostegium Schimp.

Leaves us. obtusate (acute or r. obtuse) and large, r. distant; lowest basal cells oblong-oval few not much distinct; costa thick long often subpercurrent. Capsule oval-oblong. Tufts us. olive-green. Stem often rigid, r. creeping. Plants us. robust, often sterile. — Wet rocks and logs nearly common. *Eur.* Sweden, Norway, Switzerl., Italy! *Amer.* Can.: Macoun; Waghorne.

37. **E. confertum** Dickson. — Hypnum Dicks.; Eurhynchium Milde; Rhynchostegium Br. eur.

Leaves acute or short-acuminate, nearly crowded; lowest basal cells oval-oblong, alar not much distinct; costa thin vanishing near middle, sometimes obsolete. Capsule suboblong or arcuate. Tufts green. Stem creeping not rigid. Plants not robust. — On stones, r. at base of trees. *Eur.* not r. in southern distr. Switzerl.!

* **E. Delognei** Piré; Boulay muscin. de la France.

Leaves oblong-lanceolate subdistichous; costa longer. — *Eur.* r. France: Husnot.

b. Leaves decurrent and distant. Pedicel long.

38. **E. megapolitanum** Blandow. — Hypnum Bl.; Eurhynchium Milde; Rhynchostegium Br. eur.

Leaves acute acuminate often pellucid, alar cells large numerous subquadrate; costa thin vanishing near middle. Capsule arcuate suboblong or subcylindric. Tufts green or pale green, sometimes glossy. Stem not creeping. — Sandy places and stones gen. r. *Eur.* Switzerl. Germany: Warnstorf.

2. Strigosiformia.

39. **E. strigosum** Hoffmann. — Hypnum Hoffm.; Eurhynchium Br. eur.

Leaves serrulate gen. not much distant and not long-decurrent; middle cells sublinear, lowest basal short; costa not long, vanishing above middle. Lower stem-leaves ovate-oblong acuminate. Branch-leaves subovate obtusate (acute or obtuse); their apical cells often oval-oblong; costa often short. Capsule suboblong gen. faintly constricted, r. arcuate; cilia not appendiculate. Tufts us. green and faintly glossy. Stem creeping, sometimes with paraphyllia. Dioecious or pseudo-monoecious. — On rocks and on base of trees. *Eur.* not common. Sweden and Norway not r. *Amer.* Can. common: Macoun; Waghorne. U. S.: Roell.

* **E. præcox** Hedwig. — Hypnum H.; Eurhynchium Notaris.

Branches julaceous; their leaves gen. obtuse. Tufts dense. Stem not pinnate. — Earth and rocks r. *Eur.* Norway! *Amer.* Can.: Macoun.

* **E. diversifolium** Bryol. eur.

Branches us. julaceous; their leaves gen. obtuse with suboblong inner cells. Tufts less dense. Stem sometimes pinnate. — On earth r. *Eur.* Norway! *Amer.* Can.: Macoun.

40. **E. substrigosum** Kindb. cat. Canad. m.

Differs from *E. strigosum*: Leaves larger and subdistichous, more distant and long-decurrent, glossy yellowish. Capsule strangulate larger; cilia appendiculate. Branches more distant. Monoecious. — Rocks r. *Amer.* Pacif. distr. Can. Brit. Col.: Macoun. U. S.: Roell.

41. *E. acutifolium* Kindb. rev. bryol. 1895; in Hedwigia 1897.

Differs from *E. strigosum*: Leaves long-distant long-decurrent with long subulate acumen, spreading also when dry; branches more distant; pedicel of capsule longer; monoecious. — Wet logs r. Amer. Pacif. distr. Can. Vanc. isl.: Macoun 1893. U. S. Washington: Fenzler, com. Roell.

3. Colliniformia.

A. Leaves entire somewhat large. Monoecious.

42. *E. Krausei* C. Mueller. — Hypnum C. M.; Eurhynchium Kindb.

»Leaves narrowly oblong-lanceolate short-acuminate; cells sublinear exc. the small numerous pellucid alar; costa often forking. Capsule cylindric arcuate; lid conic mamillate; pedicel short. Tufts pale green. Stem irregularly divided; branches julaceous. — Amer. r. Alaska: Krause: C. M. in Flora 1887.

B. Leaves small serrulate not decurrent. Capsule erect nearly symmetric. Synoecious.

43. *E. utahense* James. — Brachythecium Jam; Sull. icon. musc.; Eurhynchium Kindb.

Leaves broadly ovate-lanceolate gradually acuminate, serrulate or at the subulate acumen serrate; cells sublinear exc. the quadrate well-defined alar; costa reaching to middle. Perichetial leaves serrate above. Capsule suboval; cilia very short; annulus narrow; lid obtuse; pedicel short. Tufts pale fuscous. Stem creeping; branches not distinctly julaceous. Habit of *E. collinum*. — Sandstone rocks in alp. region r. Amer. »U. S. Utah»: Sullivan.

C. Leaves small gen. serrulate all around. Capsule oblique. Monoecious.

44. *E. collinum* Schleicher. — Hypnum Schl.; Eurhynchium Kindb.; Brachythecium Br. eur.

Leaves decurrent, faintly striate. Stem-leaves from broad-ovate base suddenly tapering to a subfiliform often twisted point; upper cells linear hyaline, lower oblong, angular oval-quadrate, special alar not well-defined; costa vanishing near middle or shorter. Branch-leaves ovate less abruptly narrowed and stronger dentate; costa often reaching above middle. Capsule thick suboval often horizontal; lid subobtuse; pedicel short sometimes slightly and distantly rough. Tufts green faintly glossy, us. compact. Stem creeping; branches short subjulaceous. Habit of *E. strigosum* **præcox*. — Rocks and their crevices in alps r. Eur. Norway! Amer. Can.: Macoun. U. S.: Roell, com. Cardot.

* **E.tromsoëns** Kaurin. — *Brachythecium* Kaur.; *Eurhynchium* Kindb.

Leaves more minutely denticulate, those of stem nearly entire. Pedicel smooth. — Rocks r. *Eur.* Sweden below alpine regions: Arnell.

* **E.idahense** Renaud et Cardot. — *Brachythecium* R. C.; *Eurhynchium* Kindb.

»Leaves larger, subsecund; costa reaching to $\frac{3}{4}$. Pedicel smooth sometimes 17 m. m. long. — *Amer.* r. U. S.: Ren. et Card.

45. **E.Bryhnii** Kindb. botan. notiser 1896. — *Brachythecium* collinum var. *Bryhnii* Kaurin.

Tufts less compact. Leaves narrowly ovate-oblong gradually acuminate; inner basal cells sublinear; costa longer. Capsule oblong much longer pedicellate. — Caverns of rocks in higher alp. region r. *Eur.* Norway in Knudshoe near Kongsvold 1500 metr. a. s.l.; N. Bryhn and P. Olsson.

46. **E.pseudo-collinum** Kindb. — *Brachythecium* Kindb. cat. Canad. m.

Differs from *E. collinum*: Branches not being julaceous. Leaves somewhat larger and longer, ovate-lanceolate gradually tapering to a short twisted point, not densely crowded; cells chlorophyllose, alar larger; costa reaching above middle. — *Amer.* Can. N. Brunsw. below alp. district: Moser; Labrador: Waghorne.

58. **Brachythecium** Bryol. eur.

A. Leaves gen. large and (also when moist) plicate, us. (except *B. mamilligerum*) recurved at borders. Lid of capsule not rostrate; pedicel smooth.

I. **Salebrosaria**. Leaves large (exc. *B. lævisetum* and sometimes *B. albicans*), often filiform-pointed, gen. (exc. *B. digastrum* and sometimes *B. albicans*) long. Stem often radiculose. Dioecious or monoecious, r. synoecious.

1. **Eplicata**. Leaves not plicate.

2. **Plicata**. Leaves plicate.

B. Leaves large not plicate, faintly or not recurved. Lid of capsule (exc. *B. Ryani* and sometimes *B. Vaucheri*) us. rostrate; pedicel (exc. *B. fagineum*) rough.

II. **Eurhynchiopsis**. Leaves gen. broad and not long; upper branch-leaves us. abruptly narrowed to a long filiform point. Stem sparingly radiculose; branches often julaceous. Dioecious r. fruiting.

C. Leaves large (exc. sometimes *B. populeum*) and (exc. *B.*

spurio-rutabulum and sometimes *B. rivulare*) not plicate when moist, often recurved. Lid of capsule (exc. sometimes *B. vallium* and *B. asperrimum*) not rostrate; pedicel rough.

Leaves not abruptly narrowed to the less often filiform point.

a. Leaves gen. short and broad, r. recurved, sometimes plicate.
III. Rutabularia. Pedicel of capsule distinctly and wholly rough. Mostly dioecious.

b. Leaves not plicate, often recurved, gen. long.

IV. Plumosaria. Pedicel of capsule very faintly rough or sometimes nearly smooth. Monoecious.

V. Pseudo-Plumosaria. Pedicel of capsule very rough; lid sometimes rostrate. Monoecious or dioecious.

D. Leaves not large and gen. not broad, r. plicate and less often recurved. Lid of capsule not rostrate; pedicel us. rough.

VI. Velutinaria. Stem us. creeping.

I. Salebrosaria Kindb.

1. Eplicata.

1.B.Mildei Schimper. — *Hypnum acutum* Mitten; *Brachythecium* Sull. ic. m.

Leaves nearly entire (or faintly sinuolate) narrowly ovate-oblong or ovate-lanceolate with long subulate acumen, not recurved below, subdecurent somewhat distant; alar cells somewhat large hyaline not few, the others sublinear; costa longish but not reaching to acumen. Capsule arcuate; teeth brown-yellow; cilia appendiculate; annulus none; lid conic apiculate; pedicel often long. Tufts green or yellowish faintly glossy and sparingly radiculose. Branches slightly compressed often sub-pinnate. Monoecious or synoecious us. fruiting. — Peat-bogs, logs and stones not common. *Eur.* Sweden! Germany: Milde. *Amer.* Can.: Macoun. U. S.: com. Macoun; Roell.

2.B.pseud-albicans Kindb. bull. Torr. club XVII.

Leaves short-acuminate faintly denticulate all around, somewhat distant, patent when dry; lowest basal cells finally brown, alar large on a triangular space, the others linear-lanceolate; costa short vanishing below or near middle. Stem-leaves ovate; branch-leaves ovate-oblong. Tufts yellowish sparingly radiculose. Branches compressed. Capsules unknown. Dioecious. — Wet logs or sand-dunes near Pacific sea r. *Amer.* Can. Vanc. isl.: Macoun Canad. m. n. 285.

2. Plicata.

A. Leaves us. entire, more or less appressed when dry. Lid of capsule acute; cilia not appendiculate.

a. Leaves gen. entire and glossy. Annulus of capsule narrow. Dioecious.

3. **B. albicans** Necker. — Hypnum Neck.; Brachythecium Br. eur.

Leaves (at least on branches) with long subulate acumen, sometimes small; alar cells well-defined on a narrow-rectangular space, the others linear-lanceolate; costa often reaching to acumen. Stem-leaves us. subovate or with ovate base; branch-leaves ovate-oblong or ovate-lanceolate. Capsule small suboval or faintly curved; pedicel not long. Tufts us. pale or whitish green. — Mostly on dry sand. *Eur.* not uncommon. Sweden!; M. Huss, fruiting. *Amer.* r. Can.: Macoun. Alaska: Palmer. U. S.: Roell, com. Cardot.

4. **B. glareosum** Bruch; Br. eur. — *B. tauriscorum* Molendo.

Leaves large with subulate acumen and long filiform often twisted point; alar cells well-defined, also the lowest basal short, the others linear-lanceolate; costa gen. vanishing near middle. Stem-leaves abruptly narrowed, broadly ovate-oblong. Branch-leaves ovate-lanceolate with long subulate faintly denticulate acumen and shorter point. Capsule large arcuate; pedicel us. short. Tufts us. pale green or yellowish. Stem eradiculose sometimes with paraphyllia. — Dry gravelly or calcareous places and stone-walls. *Eur.* not common. Sweden, Norway, Switzerland. *Amer.* r. Can.: Macoun; Drummond n. 174.

5. **B. turgidum** C. Hartman.

Leaves large entire ovate-lanceolate with subulate not long acumen; alar cells few and small, the others sublinear; costa vanishing near middle or somewhat longer. Capsula arcuate; pedicel not long. Tufts loose eradiculose yellow-green or golden glossy. Stem robust turgid often long and simple. — Swamps in alps r. *Eur.* Norway (fruit.); C. Hartman. Spetsbergen: R. Gyllencreutz. *Amer.* Alaska: J. M. Macoun. Greenl.: Berggren. Can.: Macoun.

b. Leaves faintly denticulate above and entire below, not glossy. Capsule not annulate. Monoecious.

6. **B. digastrum** C. M. et Kindb. cat. Canad. m.

Leaves large recurved to the short subulate acumen; alar cells small green not well-defined, the others lower suboval, the upper oblong-lanceolate; costa vanishing near acumen. Stem-leaves broad-ovate; branch-leaves ovate-oblong. Capsule curved; segments short; lid sometimes apiculate; pedicel not long. Tufts olivaceous or green. — Rocks r. *Amer.* Can.: Macoun; Moser.

B. Leaves patent when dry; those of branches us. denticulate all around. Monoecious or (*B. luteolum*) dioecious, r. synoecious.

a. Leaves entire or (at acumen) faintly sinuate.

7. *B. mamilligerum* Kindb. cat. Can. m.

Leaves large narrowly ovate-lanceolate with long subulate filiform-pointed acumen, not or indistinctly recurved below, not densely crowded, nearly spreading when moist; alar cells not well-defined, the few lowest basal short, the others linear; costa vanishing in middle or longer. Perichetial leaves with long filiform point. Capsule suboval or arcuate not large; cilia not appendiculate; annulus none; lid mamillate; pedicel long. Tufts yellowish faintly glossy, very dense and radiculose. Stem sub-pinnate; branches faintly compressed. — Wet logs near springs r. *Amer. Can. Brit. Col.: Macoun.*

b. Leaves distinctly denticulate.

aa. Alar leaf-cells small green well-defined. Perichetial leaves obtuse. Dioecious r. fruiting.

8. *B. luteolum* C. Mueller. — Hypnum C. M. syn.; *Brachythecium* Kindb.; »*B. lætum*» Schimper, non Bridel.

Leaves large with shortish acumen; cells sublinear exc. the alar; costa sometimes reaching into base of acumen. Stem-leaves ovate or ovate-oblong denticulate above and filiform-pointed; branch-leaves ovate-oblong or broadly ovate-lanceolate, denticulate all around. Capsule suboblong arcuate or suberect; cilia not appendiculate; annulus none; lid short-apiculate; pedicel not long. Tufts green often glossy and radiculose. Branches often pinnate. — On calcareous or basaltic rocks, r. on trees, r. *Eur. Switzerl., Norway! Germany: Geheeb; Roemer.*

bb. Lowest basal cells nearly uniform and dilated. Perichetial leaves acute. Monoecious us. fruiting.

9. *B. salebrosum* Hoffmann. — Hypnum Hoffm.; *Brachythecium* Br. eur.; *B. Rotæanum* Notaris; *B. sericeum* Warnstorff; »*Hypnum plumosum* Hudson»: Lindb.

Leaves large ovate-lanceolate with subulate us. long and often filiform-pointed acumen, denticulate all around, us. recurved; lowest basal cells large subquadrate, the others linear-lanceolate; costa us. vanishing near middle. Perichetial leaves us. with a faint costa. Capsule large arcuate; cilia us. appendiculate; annulus narrow subsistent; lid apiculate or acute; pedicel us. not long. Tufts more or less radiculose, us. pale or dirty green. Stem gen. not pinnate. — On stones and earth or on

base of trees. *Eur.* common. Sweden, Norway, Switzerland! *Amer.* Can. not r.; Macoun; Waghorne. U. S.: Roell, com. Cardot.

* **B. vineale** Milde.

»Leaves of stem entire. Annulus of capsule wanting. Polygamous. — *Eur.* Tirol near Meran: Milde: Limpricht.

10. **B. lætum** Bridel. — Hypnum Brid.; C. M.; Sulliv. ic. muscor.; Brachythecium Kindb., non Schimper.

Differs from *B. salebrosum*: Capsule not annulate, often less curved; cilia not appendiculate; lid sometimes mamillate. Leaves often with distinct alar cells and longer costa, us. glossy. Tufts very radiculose and dense. »Not easily distinguished from *B. salebrosum*: Sull. l. c. (delineated as dioecious). — Logs in shady places. *Amer.* not r. Can.: Macoun; Moser; Lawson; Waghorne. U. S.: Sullivant, com. C. Mueller; Austin, com. Macoun.

11 **B. lævisetum** Kindb. bull. Torr. club XVII.

Differs from the last and *B. salebrosum* in smaller not subulate-acuminate leaves and their longer costa; branch-leaves very short-acuminate with filiform often twisted point. Leaves ovate-lanceolate acute, denticulate above middle, crowded, not much patent when dry; lowest basal cells dilated, the others sublinear; costa vanishing in acumen. Capsule small arcuate; cilia short; annulus not seen; lid convex obtuse; pedicel not long. Perichetial leaves nerveless. Tufts glossy green. Resembles *B. populeum*. — Logs r. *Amer.* Can.: Macoun.

II. Eurhynchiopsis Kindb.

A. Leaves, princ. the uppermost of branches, with long hairlike point.

a. Leaves gen. entire, sometimes faintly denticulate near apex or also in upper basal part, often not decurrent; alar cells few; costa reaching to middle or shorter. Capsules unknown.

12. **B. cirrosum** Schwægrichen. — Hypnum Schw.; Brachythecium Schimper; B. Funckii and Myurium herjedalicum Schimp.

Leaves suboblong abruptly narrowed, often recurved below; upper cells linear, the lower lanceolate. Tufts often glossy or bright green. Stem r. pinnate; branches obtuse us. julaceous. — Earth in alp. regions r. *Eur.* Norway, Switzerland! *Amer.* »Greenl.»: Pansch.

b. Leaves (at least those of branches) denticulate all around, decurrent; angular (alar) cells large numerous; costa reaching to or above middle.

13. **B. piliferum** Schreber. — Hypnum Schr.; Brachythecium Kindb.; Eurhynchium Br. eur.

Leaves ovate-oblong abruptly narrowed; cells sublinear exc. the alar. Stem-leaves nearly entire. Capsule oval-oblong or arcuate; lid rostrate; pedicel faintly rough. Stem pinnate; branches not julaceous. Tufts green. — On earth among grass, r. on rocks. — *Eur.* common. Sweden! *Amer.* r. Can.: Moser; Waghorne. U. S.: Austin, com. Macoun.

14. **B. Ryani** Kaurin.

Differs from the last: Leaves nearly gradually acuminate, those of branches broadly ovate-lanceolate. Lid of capsule not rostrate. — On earth r. *Eur.* Norway: Ryan, com. Kaurin.

15. **B. Vaucheri** Schimper. — *Eurhynchium* Sch.; *Brachythecium* Kindb.; *Hypnum* C. M.

Leaves from broadly ovate-oblong base gradually or abruptly narrowed, denticulate all around; cells lanceolate exc. the alar. Branch-leaves sometimes ovate-lanceolate. Capsule subovate or oblong; lid rostellate or short-apiculate. Stem not pinnate; branches us. julaceous. — Rocks gen. r. *Eur.* Switzerl.! Sweden: P. Olsson (fruit.). Germany: Schimper. *Amer.* r. »Can.: Macoun»: Lesq. et Jam.

16. **B. fagineum** (H. Mueller as var.) Kindb. in check-list. — *Eurhynchium* Vaucheri var. *fagineum* H. Muell.; »*E. germanum* Grebe»: Limpricht.

Leaves ovate-lanceolate gen. gradually acuminate and nearly entire somewhat small, not appressed when dry; cells as in the last. »Capsule curved; lid rostrate; pedicel smooth»: Limpricht. — Trees r. *Eur.* Switzerl.! France: Husnot.

B. Leaves abruptly narrowed to a short narrowly subulate often twisted point, short-decurrent.

17. **B. crassinerve** Taylor. — *Hypnum* Tayl.; *Brachythecium* Kindb.; *Eurhynchium* Br. eur.

Leaves broad-ovate or ovate-oblong denticulate princ. above; upper cells lanceolate, lower oblong-oval very numerous, alar nearly similar often green; costa us. thicker at base, reaching to $\frac{3}{4}$ or shorter, sometimes forked. Perichetial leaves costate long-subulate. Capsule oval-oblong; lid rostrate; cilia not appendiculate. Tufts us. green sometimes silky glossy. Stem irregularly divided; branches long often thick and julaceous. Habit of *B. rutabulum* or *B. populeum*. — Shady or humid gen. calcareous rocks. *Eur.* not r. Sweden, Germany, Switzerl., Italy!
18. **B. colpophyllum** Sullivant. — *Eurhynchium* Sull. ic. m.; *Brachythecium* Kindb.

Differs from the last: Leaves more faintly denticulate; alar

and lowest basal cells suboval, the others sublinear or the uppermost lanceolate. Perichetial leaves nerveless with long filiform point. Capsule subcylindric. Stem subpinnate; branches short. — *Amer.* r. U. S. Pacif. distr.: Roell.

III. *Rutabularia* Kindb.

A. Leaves not or r. (sometimes in *B. rivulare*) plicate, not or faintly recurved.

a. Monoecious us. fruiting.

19. *B. rutabulum* Linné. — *Hypnum* L.; *Brachythecium* Br. eur.

Leaves more or less decurrent; alar cells hyaline somewhat large but gen. not forming distinct auricles, the others linear-lanceolate; costa vanishing above middle. Stem-leaves ovate gradually short-acuminate, minutely denticulate all around. Branch-leaves ovate-oblong longer acuminate and more distinctly denticulate princ. above. Perichetial leaves with long filiform point. Capsule ovate-oblong or cylindric arcuate; teeth brown; cilia not appendiculate; lid acute; pedicel very rough, sometimes long. Tufts sparingly radiculose. Stem irregularly divided or with pinnate not compressed branches. — Rocks and logs princ. in woods in dry stations, r. in water. *Eur.* common below alp. regions. Sweden, Switzerl., Italy! *Amer.* Can. r.: Macoun; Burgess; Waghorne.

20. *B. rutabuliforme* Kindb. cat. Canad. m.

Differs from the last: Leaves shorter acuminate. Pedicel of capsule about 1 c. m. long; cilia appendiculate. Stem very rigid. — Stones in brooks r. *Amer.* Can. Brit. Col.: Macoun.

b. Dioecious r. fruiting.

21. *B. rivulare* Br. eur. — *B. rivulare* **Novæ Brunsviciæ* Kindb. in *Ottawa Natural.* IV.

Leaves long-decurrent, broader and shorter than in *B. rutabulum*; alar cells very large and hyaline or reddish, forming distinct auricles, the others lower basal suboval more numerous; costa us. vanishing near or not much above middle. Stem-leaves broad-ovate with very short point and nearly entire. Branch-leaves broadly ovate-oblong. Capsule, cilia and lid as in *B. rutabulum*; teeth red or (in european specimens) brown-red; pedicel not very rough and not long. Tufts nearly eradiculose. Stem divided in pinnate sometimes nearly tree-like branches. — Wet rocks and stones gen. in running water. *Eur.* common also in alps. Sweden, Norway, Germany, Switzerl., Italy! Germany (fruiting): Schimper. *Amer.* not common.

Can. not r. and sometimes fruiting: Macoun; Moser; Drummond n. 178. Alaska: J. M. Macoun.

* **B. flavescens** Bridel. — Hypnum Brid.; Kindb. Laubm. Schwed. u. Norw.; Brachythecium Kindb.

Leaves very broad and abruptly acuminate; costa often short and forked. Pseudo-monoecious. — *Eur.* r. Sweden in a grassy ditch near Linköping, fruiting!; near Norrköping: P. Olsson.

* **B. latifolium** Lindberg. — Hypnum Ldb.; Brachythecium Philibert.

Leaves smaller less crowded, nearly entire and not striate, more gradually acuminate. Capsules not seen. — Wet places in alp. regions r. *Eur.* Norway, Switzerl.! Finland: Brotherus. *Amer.* N. Foundl.: Waghorne.

22. **B. platycladum** C. M. et Kindb. cat. Can. m.

Differs from *B. rutabulum*: Leaves distinctly auricled with well-defined alar cells. Pedicel of capsule shorter. Branches compressed. Stones in woods r. *Amer.* Can.: Macoun; Moser; White.

B. Leaves plicate and recurved.

23. **B. cavernosum** Kindb. revue bryol. 1895.

Differs from *B. rutabulum*: Leaves more concave, recurved on both sides to acumen; alar and lower basal cells small green not well-defined. Lid of capsule longer pointed or rostellate. — *Amer.* r. Can.: White, com. Macoun.

24. **B. spurio-rutabulum** C. M. et Kindb. cat. Can. m.

Differs from *B. rutabulum*: Leaves longer acuminate recurved to middle, loosely disposed and long-decurrent, very much patent when dry; alar cells gen. less defined. Pedicel of capsule short. Stem pinnate creeping. — Logs r. *Amer.* Can.: Macoun; Waghorne.

* **B. columbico-rutabulum** Kindb. cat. Canad. m.

Stem-leaves nearly entire; alar cells well-defined. Pedicel of capsule longer. — Logs by water r. *Amer.* Can. Brit. Col.: Macoun.

IV. Plumosaria Kindb.

A. Pedicel of the capsule smooth below, faintly rough or sometimes nearly smooth above. Stems us. densely tufted and creeping.

a. Stem-leaves short broad subovate short-acuminate.

25. **B. plumosum** Swartz. — Hypnum Sw.; Brachythecium Br. eur.; Hypnum pseudo-plumosum Bridel; C. M.

Leaves gen. crowded, sometimes short-decurrent, nearly entire

but more or less distinctly denticulate at acumen, often recurved to it; cells gen. sublinear except the few small in the angles impressed alar; costa gen. vanishing near middle. Branch-leaves ovate-oblong or ovate-lanceolate, long-acuminate often filiform-pointed. Perichetial leaves sheathing nerveless, the inner denticulate with long falcate acumen. Capsule oval-oblong or faintly curved; cilia appendiculate; lid acute or apiculate; pedicel short. Stem creeping less often subpinnate. Tufts dense us. yellowish brown and glossy. — Wet places princ. on siliceous rocks in rivulets, common. *Eur.* Sweden, Norway, Germany, Switzerl.! *Amer. Can.*: Macoun; Waghorne. U. S. Austin, com. Macoun.
26. *B. semiasperum* C. M. et. Kindb. — *Eurhynchium* cat. Canad. m.

Leaves nearly crowded decurrent nearly entire, from broad-cordate base tapering to a narrow subulate acumen; upper and middle cells sublinear, lower dilated; alar cells not defined; costa vanishing near or above middle. Perichetial leaves sub-oblong short-acuminate entire nerveless erect. Capsule small suboval erect or inclined; teeth papillose above; segments shorter than the high basal membrane; pedicel about 0,6 centim. long. Tufts sparingly radiculose, loose and green. Branches unilateral, gen. simple and short. Habit of the last. — Rocks in brooks r. *Amer. Can.*, Brit. Col.: Macoun.

b. Leaves gen. long narrow long-acuminate.

27. *B. populeum* Hedwig. — *Hypnum* H.; *Brachythecium* Br. eur.

Leaves gen. long and not broad, with long acumen and short point, often entire at least below middle, recurved often to acumen, crowded, not or slightly decurrent; lowest basal cells short dilated, alar not defined; other cells sublinear; costa reaching to or in acumen, sometimes excurrent. Stem-leaves with ovate or ovate-oblong base, more or less striate; branch-leaves narrower. Perichetial leaves nearly nerveless, entire below the long falcate acumen. Capsule suboval not large; teeth pale; cilia r. appendiculate; lid acute or apiculate; pedicel sometimes long. Tufts us. green often glossy. Stem sometimes subpinnate. Leaves sometimes small. — Rocks and trees princ. below alp. regions. *Eur.* common. Sweden etc.! *Amer. Can.* nov r.: Macoun.

* ***B. nanopes*** C. M. et Kindb. cat. Canad. m.

Leaves small narrow less recurved at base. Capsule smaller; teeth pale orange; pedicel very short. Tufts brownish nearly

eradiculose. — Earth in subalp. region r. *Amer.* Can. Brit. Col.: Macoun.

B. Pedicel of capsule faintly rough in its whole length. Tufts loose sparingly radiculose. Stem irregularly branching. Cilia of endostome not appendiculate.

a. Leaves auricled with distinct alar cells; other cells sublinear.

28. B.campestre Bruch; Br. eur.

Leaves denticulate all around, recurved at one border to acumen, decurrent, narrowly ovate-oblong or ovate-lanceolate often with subfiliform twisted point; alar cells few hyaline somewhat large; costa vanishing below acumen. Capsule arcuate; teeth orange; lid apiculate; pedicel gen. long. Tufts green or yellowish faintly glossy. Habit of *B. salebrosum*. Dry and grassy places sometimes on rocks. *Eur.* r. Sweden!; H. Thedenius. Norway; Bryhn. Germany: Warnstorf. Austria: Berggren. *Amer.* Can. less r.: Macoun; Moser. U. S. New Jersey: com. Macoun.

29. B.leucoglaucum C. M. et Kindb. Canad. m.

Leaves sharply serrate above, recurved only near base, from ovate base suddenly tapering to a somewhat long subfiliform point; alar cells small numerous; costa long sometimes subpercurrent. Tufts whitish or subglaucous green. Otherwise as the last. — Earth and logs in woods r. *Amer.* Can. New Brunswick: J. Moser.

b. Leaves not auricled; lowest basal cells dilated nearly uniform, alar not well-distinct; other cells linear.

30. B.mirabundum C. M. et Kindb. l. c.

Leaves nearly entire below, denticulate at the very long involute or channelled acumen, broadly recurved at least at one side to it, ovate-lanceolate very long, gradually narrowed from the subovate concave basal part, short-decurrent; costa vanishing in acumen. Capsule small arcuate; teeth brown; pedicel very short. Tufts faintly or silky glossy, yellowish or pale green, nearly eradikulose. Branches sciuroid-curved. — Logs in woods r. *Amer.* Can. eastern distr.: Moser; Waghorne.

31. B.gemmascens C. M. et Kindb. l. c.

Leaves faintly denticulate all around, not decurrent, narrowly ovate-lanceolate with twisted point; costa vanishing below acumen. Capsule small round-oval oblique; teeth dark orange; segments short; lid conic apiculate; pedicel long. Tufts dense green or

finally rufescent. Stem furnished with numerous male buds.
— Wet logs r. *Amer.* Can. Brit. Col.: Macoun.

V. *Pseudo-Plumosaria* Kindb.

32. *B. asperillum* Mitten; Sulliv. icon. musc.

Leaves minutely denticulate below, sharply serrate above, ovate-lanceolate long-cuspidate, not or faintly plicate, decurrent and somewhat distant; alar cells few not large, the others linear; costa reaching to acumen or shorter. Capsule arcuate. Dioecious. *Amer.* Pacif. distr. r. Can.: Douglas, com. C. Mueller.

33. *B. vallium* Sullivant et Lesquereux. — *Hypnum* Sull. et Lq.; *Brachythecium* Kindb.

Differs from the last: Leaves nearly entire, faintly denticulate at acumen. Pedicel of capsule shorter. Monoecious. — Logs r. *Amer.* Pacif. distr. Can.: J. and J. M. Macoun. U. S.: Bolander, com. C. Mueller.

VI. *Velutinaria* Kindberg.

A. All leaves distinctly denticulate all around, not falcate when dry. Pedicel of capsule smooth.

34. *B. Fendleri* Sullivant. — *Hypnum* Sull. icon. m.; *Brachythecium* Kindb.

Leaves ovate-oblong with long subulate or filiform point, recurved near base or to acumen, crowded, sometimes decurrent, suberect; inner cells sublinear; costa reaching to or above middle. Branch-leaves serrulate. Perichetial leaves dentate above. Capsule oval-oblong, thick at base, nearly straight and suberect, very small; lid mamillate. Tufts glossy green. Stem pinnate or subpinnate. Sometimes synoecious. — Rocks r. *Amer.* U. S.: Fendler, herb. Sullivant, com. Renauld.

35. *B. Hillebrandi* Lesquereux; Sullivant icon. m.

Differs from the last: Leaves without filiform point, broader at base and not or indistinctly recurved; upper cells lanceolate, alar numerous on a triangular space nearly reaching to costa. Stem-leaves subabruptly narrowed; perichetial nearly entire. Capsule suboval faintly inclined. Tufts silky glossy. — Rocks r. *Amer.* »U. S.: Bolander»: Sulliv.

36. *B. biventreosum* C. Mueller (in sched.).

Leaves crowded oblong-lanceolate long-acuminate sometimes recurved to acumen; alar and lower basal cells short small, the others linear; costa vanishing above middle. Branch-leaves narrower than those of stem. Capsule oblong; lid apiculate; pedicel less than 1 centim. long. Tufts green; branches very

short. Habit of *B. velutinum*. — Logs in woods r. Amer. U. S.: Joor, com. C. Mueller.

B. All leaves nearly entire, not falcate.

a. Dioecious. Branches julaceous or subjulaceous.

37. B. californicum Lesquereux. — Hypnum Lq.; Brachythecium Kindb.

Leaves recurved below, long-decurrent somewhat distant; alar cells dusky obsolete, the others lanceolate; costa reaching above middle or shorter. Stem-leaves entire ovate-oblong; branch-leaves broadly ovate-lanceolate sometimes faintly sinuate. Capsule oval-oblong arcuate; pedicel short, rough above. Tufts pale green loose sparingly radiculose. Stem subpinnate. — Rocks and dry sand r. Amer. U. S.: Bolander, com. C. Mueller.

38. B. Fitzgeraldi C. Mueller in Flora 1887.

Leaves more or less (often faintly) recurved, nearly entire, ovate-oblong not long-acuminate, acute or with short filiform point, crowded and not distinctly decurrent; alar cells oval or subquadrate reaching to costa, the others linear; costa not long, vanishing below acumen. Capsules unknown. — Amer. r. U. S. Florida: Fitzgerald, com. C. Mueller.

b. Monoecious. Branches often compressed, not julaceous.

39. B. Donnellii Austin. — Hypnum Aust.; Brachythecium Kindb.

Leaves narrowly ovate-lanceolate long-subulate often filiform-pointed, entire or at acumen obsoletely sinuate, distant not decurrent; alar cells hyaline somewhat large, the others linear-lanceolate; costa vanishing near middle or shorter. Capsule small suboval horizontal faintly curved; pedicel short smooth. Tufts glossy green: Stem subpinnate creeping. — Rocks and logs r. Amer. Can.: Macoun.

C. Leaves sometimes falcate princ. when dry; those of stem nearly entire, those of branches distinctly denticulate. Monoecious.

a. Leaves plicate, those of branches denticulate at acumen.

40. B. calcareum Kindb. revue bryol. 1895.

Leaves crowded long-acuminate filiform-pointed more or less recurved, incurved-falcate when dry, patent when moist; angular cells short, special alar few hyaline much larger, the others linear. Stem-leaves with broad base; costa short gen. vanishing near middle. Branch-leaves narrow; costa nearly reaching to acumen. Capsule small arcuate; cilia not appendiculate; lid apiculate; pedicel smooth about 1 centim. long. Tufts dense

radiculose green faintly glossy. Stem irregularly divided; branches not compressed. Habit of *B. intricatum*. — Limestone rocks r. *Amer.* Can. Ottawa: Macoun 1892.

b. Leaves not plicate, those of branches denticulate all around.

41. *B. velutinum* L. — Hypnum L.; Brachythecium Br. eur. in part; *B. vagans* Milde (a sometimes synoecious variety).

Leaves long-acuminate not recurved, distant short-decurrent, us. not curved when dry; alar cells very few scarcely distinct, the others linear-lanceolate; costa reaching above middle or shorter. Stem-leaves ovate-lanceolate; branch-leaves much narrower. Perichetial leaves dentate above. Capsule thick suboval horizontal; pedicel rough. Tufts green often glossy, very radiculose and dense. Stem us. pinnate. — Stone and wood. *Eur.* common below alp. regions. Sweden, Switzerl. *Amer.* not common. Can.: Macoun.

42. *B. intricatum* Hedwig. — »Hypnum Hedw.; Schreber; Bridel»: C. M. syn.; Brachythecium Kindb.; Hypnum declivum Mitten.

Differs from the last: Leaves shorter and less distant not distinctly decurrent, us. falcate or incurved when dry; alar cells distinct hyaline not few. Stem-leaves ovate-oblong or broadly ovate-lanceolate, branch-leaves not much narrower. Stem r. pinnate. Tufts sometimes golden glossy. — Stone and wood. *Eur.* probably common below alp. regions. Sweden, Germany, Switzerl. France; Boulay. Belgium: Gravet. Italy: Arangeli. *Amer.* Can.: Macoun. U. S.: Roell.

* *B. salicinum* Bryol. eur.

Pedicel of capsule wholly or nearly smooth. — Trees r. *Eur.* Spain: Dieck, com. Roell. France: Philibert.

43. *B. venustum* Notaris. — *B. olympicum* Juratzka.

Differs from *B. velutinum*: Leaves shorter and nearly uniform with long filiform or sublinear point, long-decurrent gen. recurved below nearly to middle, often subfalcate at least when dry. Capsule oval-oblong arcuate; pedicel smooth. Tufts pale green loose sparingly radiculose. — Leaves subdistant; those of stem ovate-oblong; alar cells nearly indistinct; costa reaching above middle or shorter. Branch-leaves broadly ovate-lanceolate. Stem subpinnate. — Stone and wood r. *Eur.* Switzerl. near Lugano! Cyprus: Unger. Portugal: Levier. Sweden near Norrköping: A. Grape.

44. *B. subintricatum* Kindb. revue bryol. 1895.

Leaves narrowly ovate-oblong or ovate-lanceolate nearly uniform (those of branches not much narrower), nearly crowded (at least those of stem), decurrent, not falcate when dry; alar cells few, the others linear; costa vanishing above middle. Capsule arcuate; pedicel very rough. Stem subpinnate. — Differs from *B. velutinum* and *B. intricatum*: Leaves faintly denticulate filiform-pointed; alar cells often dilated. Perichetial leaves nearly entire with long filiform deflexed point. Capsule oblong-cylindric arcuate. Tufts loose sparingly radiculose dusky green. Branches faintly compressed. — Trees r. Amer. Can. Vanc. isl.: Macoun 1893.

45. *B. pseud-erythrorhizon* Kindb. in Hedwigia 1896 p. 68.

Differs from *B. velutinum* and *B. intricatum*: Leaves falcate also when moist, with more or less recurved borders; those of stem more distinctly denticulate, those of branches with long filiform point. Differs also from *B. intricatum* in decurrent leaves; from *B. velutinum* in less distant leaves falcate also when dry, those of branches not much narrower, alar cells numerous. Agrees with *B. velutinum*: Leaves decurrent; pedicel of capsule rough in its whole length etc. — Higher alp. region r. Amer. U. S. Pacif. distr.: Roell.

59. *Campyllum* (Sullivant as subg.) Mitten and Lindb., in part.

I. *Campylidium*. Leaves denticulate; costa short and double or obsolete. Stem irregularly divided. Monoecious. Growing on rocks or at base of trees.

1. *Striatella*. Leaves small long-decurrent; alar cells large. Capsule small narrow-cylindric nearly straight. Branches often compressed.

2. *Hispidula*. Leaves not decurrent and not large; alar cells small. Capsule arcuate often large. Branches not compressed.

II. *Eu-Campyllum*. Leaves gen. entire; costa often simple. Stem often pinnate. Us. dioecious. Growing on wet places.

1. *Stellata*. Leaves entire not decurrent, ovate-lanceolate crowded, often large. Capsule large us. arcuate; pedicel long.

3. *Chrysophylla*. Leaves r. sinuate-denticulate above, sometimes decurrent and distant, not large; alar cells small. Capsule arcuate not large; pedicel sometimes short.

I. *Campylidium* Kindb.

1. *Striatella*.

1. *C. striatellum* Bridel. — *Leskea* Brid.; *Campyllum* Kindb.; *Plagiothecium Muehlenbeckii* Schimp.; *Hypnum* Lq. et Jam.

Leaves ovate-oblong long-cuspidate filiform-pointed, distinctly

denticulate all around, not recurved, often subdistichous; cells oblong-lanceolate exc. the hyaline or orange alar. Capsule long-necked finally striate; lid obtuse; pedicel long. Tufts dense glossy green. Branches erect. Habit of *C. hispidulum* and some *Raphidostegia*. — Rocks near sea, princ. the Atlantic, and in alps, gen. r. *Eur.* Sweden and Norway (not r. on sea-coasts), Switzerl.! *Amer.* Can. near Atl. sea: Waghorne. Alaska: J. M. Macoun.

2. *C. Fitzgeraldi* Renauld. — *Plagiothecium* Ren.; *Campylium* Kindb.; *Hypnum* Lesq. et Jam.

Differs from the last: Leaves narrower and nearly entire, brown at insertion; cells longer and more chlorophyllose, the alar brown less large. Capsule (unripe) short-necked; pedicel less long. Branches not erect. Tufts brown not glossy. — Rocks r. *Amer.* Can.: Waghorne.

2. *Hispidula*.

3. *C. hispidulum* Bridel. — *Hypnum* Brid.; Sull. ic. musc.; *Campylium* Lindberg.

Leaves denticulate all around, distant, very spreading also when dry, from short broad-cordate base abruptly tapering to a long acumen; inner cells (as in *Amblystegium*) suboblong; angular cells suboval numerous, special alar not well-defined; costa us. indistinct. Perichetial leaves denticulate above. Capsule large arcuate; cilia appendiculate; lid apiculate. Tufts green somewhat high. Branches us. erect. — Rocks and base of trees. *Eur.* r. Sweden: P. Olsson; E. Nyman. Finl.: Brotherus. *Amer.* not r. Can.: Macoun; Moser. U. S.: Henry, com. Cardot.

4. *C. Sommerfeltii* Myrin. — *Hypnum* Myr.; *Campylium* Kindb.

Differs from the last: Leaves smaller and less distant, entire above, not spreading when dry; inner cells oblong-lanceolate; costa sometimes distinct, r. simple. Capsule smaller; lid not apiculate; cilia not appendiculate. Tufts intricate greer or yellowish. Branches us. decumbent. — Rocks and logs. *Eur.* gen. r. Sweden not r.; Myrin. Switzerl., Norway! *Amer.* Can. not r.: Macoun; Moser.

*** *C. byssirameum*** C. M. et Kindb. — *Hypnum* cat. Can. m.

Leaves very small, denticulate all around. Capsules unknown. — On base of trees r. *Amer.* Can.: Macoun.

II. *Eu-Campylium*.

1. *Stellata*.

A. Leaves very spreading; cells linear exc. the alar; costa

obsolete or very short. Perichetial leaves nerveless. Dioecious not often fruiting.

5. C. stellatum Schreber. — Hypnum Schr.; Campylium Kindb.

Leaves not falcate, somewhat short-cuspidate (with somewhat short subulate part of the acumen), us. abruptly attenuate. Tufts us. not or sparingly radiculose, green or brown. Stem and branches us. erect, r. pinnate. — Common. *Eur.* Sweden etc. *Amer. Can.:* Macoun. U. S.: com. Macoun.

6. C. protensum Bridel. — Hypnum Brid.; Campylium Kindb.

Leaves long-cuspidate gradually attenuate, the uppermost us. falcate. Stem gen. pinnate and creeping. — Not common. *Eur.* Norway, Switzerl. Sweden: E. Nyman. France: Husnot. *Amer. Can.:* Macoun.

B. Leaves gen. not much spreading; upper cells linear, the lower us. dilated; costa often long, sometimes obsolete. Perichetial leaves plicate (as in the both last), costate. Sometimes polygamous.

7. C. polygamum Br. eur. — Amblystegium Br. eur.; Campylium Kindb.; Hypnum Schimper.

Leaves long-cuspidate gen. gradually attenuate, not falcate. Tufts radiculose. Stem with gen. not pinnate branches. — Not common. *Eur.* Norway, Switzerl. Finl.: Lindberg. *Amer. Can.:* Macoun; Moser; Waghorne.

2. Chrysophylla.

A. Leaves very distant, not decurrent; cells sublanceolate exc. the alar. Monoecious.

8. C. hygrophilum Juratzka. — Hypnum Jur.; Campylium Kindb.; Amblystegium Schimper.

Leaves broadly ovate-lanceolate or from subovate base long-acuminate, nearly entire; costa sometimes reaching to middle. Peristomial teeth orange. Stem pinnate. Resembling *Hypnum riparium* but very much smaller. — Rare. *Eur.* Switzerl. Finl.: Lindberg. *Amer.* U. S.: Roell.

B. Leaves crowded not spreading; cells linear, the alar nearly indistinct. Capsules unknown.

9. C. Duriei Montagne. — Hypnum Mont.; C. M. syn.; Campylium Kindb.; «Orthothecium Bescherelle»: Husnot.

Leaves narrowly ovate-lanceolate long-acuminate filiform-pointed, faintly sinuolate above middle; costa very thin vanishing near middle or obsolete. Stem irregularly divided. Tufts intricate very dense. — *Eur.* r. France, Provence: Philibert.

C. Leaves spreading gen. with ovate base; alar cells distinct, the others us. linear. Dioecious.

a. Leaves nearly crowded not decurrent; angular (alar) cells few.

10.C.chrysophyllum Bridel. — Hypnum Brid.; Campylium Kindb.

Leaves entire (or the uppermost sinuolate) long-cuspidate; cells gen. linear exc. the us. yellow alar; costa thin reaching to middle or obsolete. Perichetial leaves costate faintly striate, abruptly narrowed. Peristome pale. Branches us. pinnate. Tufts sparingly radiculose, not much dense. — Common. *Eur.* Sweden, Norway, Switzerl. *Amer.* Can.: Macoun; Moser; Waghorne. U. S.: Langlois, com. Cardot.

11.C.unicostatum C. M. et Kindb. — Hypnum cat. Canad. m.

Leaves entire shorter-acuminate than in the last; alar cells small not yellow, the others gen. linear; costa gen. distinct. Perichetial leaves costate, gradually subulate-acuminate or with filiform falcate point. Capsule smaller than in the last. Stem irregularly divided. Tufts very dense. — *Amer.* r. Can.: Macoun; Moser.

12.C.sinuolatum Kindb. in Hedwigia 1897 p. 47.

Leaves sinuolate short-acuminate; alar cells hyaline, the others sublanceolate; costa long somewhat thick. Stem irregularly divided. Tufts dense. Capsules unknown. — *Amer.* r. U. S. Ohio: Purpus, com. Roell.

b. Leaves decurrent entire more or less distant, recurved at base; angular cells numerous hyaline.

13.C.decursivulum C. M. et Kindb. — Hypnum cat. Canad. m.

Leaves from broad-ovate base long-cuspidate; costa not long. Capsule arcuate; lid apiculate; pedicel very long. Perichetial leaves costate plicate short-cuspidate filiform-pointed. Stem often pinnate. Tufts loose. — *Amer.* Can.: Macoun. *Eur.* Sweden: P. Dusén.

14.C.bergenense Austin. — Hypnum Aust.; Campylium Kindb.

Leaves short very small, ovate-cordate or ovate-oblong, shortly cuspidate; costa often prolonged nearly to acumen. Capsule small arcuate; pedicel not long. — *Amer.* r. U. S.: Roell; Austin, com. C. Mueller.

60. Heterophyllum Kindb., new genus.

A. Leaves entire somewhat large.

1.H.Haldanei Greville. — Hypnum Grev.

Leaves ovate-oblong acute or short-acuminate, recurved below

at one side, subdecurrent, finally yellow at insertion; alar cells subquadrate (larger than in *Hypnum cupressiforme*) often hyaline, disposed on a short-triangular space, the others linear. Capsule subcylindric us. nearly straight; lid rostrate or rostellate; pedicel somewhat long. Tufts radiculose at least below, us. green sometimes golden glossy. Stem irregularly divided; branches sometimes compressed; paraphyllia numerous. Monoecious. — Logs and stones in woods. *Eur.* r. Switzerl. France: Philibert. Germany: Schimper. *Amer.* not r. Can.: Macoun; Moser; Waghorne. U. S.: Sullivan and Schrader, com. C. Mueller.

2. *H. flaccum* C. M. et Kindb. — *Hypnum* cat. Canad. m.

Differs from the last: Leaves narrower, ovate-lanceolate; alar cells larger. Stem subpinnate; branches cuspidate often compressed. Dioecious. Capsules unknown. — Rocks and logs r. *Amer.* Can.: Macoun; Moser; Waghorne.

B. Leaves large, strongly serrate at acumen.

3. *H. nemorosum* Koch. — *Hypnum* Koch.

Leaves ovate-lanceolate, recurved below, crowded and not decurrent, yellow at insertion; apical cells lanceolate, alar large subquadrate hyaline or orange on a nearly round space; other cells linear. Stem-leaves nearly entire below the subulate acumen. Branch-leaves denticulate above middle, with sublinear somewhat broad half-twisted point. Capsule large suboblong or arcuate; lid acute; pedicel long. Tufts pale green, sparingly radiculose. Stem pinnate; branches cuspidate not compressed. Monoecious. Habit of *Calliergon cuspidatum*. — Trees and logs in woods r. *Eur.* Germany: Milde. *Amer.* »U. S.«: Lesquereux.

C. Leaves small, minutely denticulate at acumen.

4. *H. pseudo-nemorosum* Kindb. n. sp.

Leaves ovate-oblong denticulate at the subulate acumen, not distinctly recurved, decurrent, not yellow at insertion; alar cells small few dusky on a short-triangular space; apical cells lanceolate, the inner linear-lanceolate. Tufts glossy velvet-like. Stem subpinnate; branches faintly compressed; paraphyllia broad not numerous. Capsules unknown. Habit of *Pylaisiella velutina*. — *Amer.* r. Can. N. Brunswick: Moser, com. Macoun.

5. *H. subadnatum* C. M. et Kindb. — *Raphidostegium* cat. Can. m.

Leaves ovate-oblong short-acuminate acute, denticulate above middle, recurved below, not decurrent; alar and lower marginal cells quadrate, the others suboblong as in *Amblystegium*. Peri-

chetal leaves serrate longer acuminate. Capsule cylindric arcuate strangulate; lid large rostellate; peristome not seen; pedicel flexuous deflexed arcuate. Tufts dense green. Stem creeping not pinnate; branches subjulaceous often incurved at the tops; paraphyllia broad. Probably monoecious. — Trees. r. *Amer.* Can.: Macoun; Dearness, com. Macoun.

61. *Myurium* Schimper.

1. *M. Boscii* Schwægrichen. — *Hypnum* Schw.; Sulliv. icon. m.; *Myurium* Kindb.

Leaves large very concave not decurrent, from ovate-cordate not recurved base abruptly narrowed to a subulate often twisted point, striate, denticulate all around; alar cells few suboval or irregular, lower basal often brownish, the others sublinear; costa simple vanishing above middle or short and double. Capsule large oblong-oval curved; annulus broad; segments nearly split; cilia 3 not much shorter, not appendiculate; pedicel 2—3 centim. long. Perichetial leaves abruptly long-subulate. Stem subpinnate or irregularly divided; branches robust turgid. Dioecious r. fruiting. — Earth in woods. *Amer.* U. S. »not uncommon»: Sullivant. Austin, com. Macoun; Sullivant, com. C. Mueller; Fitzgerald, com. Renault.

* *M. coloradense* Austin. — *Hypnum* Aust.; *Myurium* Kindb.

Cells of branch-leaves often oval-oblong princ. the upper, sometimes also the angular. Capsules unknown. — *Amer.* r. U. S. Arkansas Hot Springs: Ch. Roell, com. J. Roell.

2. *M. Hebridarum* Schimper.

Differs from *M. Boscii*: Leaves narrower, from ovate-oblong or oblong-linear base more abruptly contracted to the point, not striate; costa indistinct. Capsules unknown. — Rocks near sea r. *Eur.* Scotl.: Fergusson, com. Husnot (Africa, Madeira: G. Fritze, com. Roell and Kaurin).

62. *Hypnum* L.; Dillenius; in part.

A. Leaves with simple (sometimes in *H. Bambergeri* short and double) costa. Dioecious or (in *H. fluviatile* and sometimes in *Harpidium*) monoecious.

a. Leaves (exc. *H. erythrorhizon* and *H. harpidioides*) not recurved at borders.

I. *Alaria*. Leaves (princ. the youngest) mamilllose above, us. striate; middle cells often dilated, alar often yellow; costa thick. Stem us. pinnate; paraphyllia present. Leaves falcate.

II. *Cratoneuron*. Leaves not mamilllose, gen. not striate; middle cells gen. dilated, alar gen. distinct but r. yellow; costa

gen. thick. Stem us. not pinnate, r. with paraphyllia. Leaves sometimes not falcate.

III. **Harpidium**. Leaves gen. not mamilllose, in few species striate; cells gen. narrow exc. the gen. hyaline or sometimes not distinct alar; costa gen. not thick. Stem us. not radiculose, sometimes pinnate; paraphyllia wanting. Leaves (in few species) sometimes not falcate.

aa. Alar leaf-cells not distinct.

1. **Riparia**. Leaves gen. straight subdistichous; lower basal cells nearly uniform subquadrate in 2—5 rows. Monoecious often fruiting. Stem often radiculose. — Growing princ. on logs in water.

2. **Revolventia**. Leaves falcate; lower basal cells gen. few, short and dilated. Sometimes monoecious. Stem not radiculose. Leaves often reddish. — Growing in swamps.

bb. Alar leaf-cells distinct.

3. **Adunca**. Leaves not r. straight (princ. in *H. fluitans*, *H. exannulatum* and *H. elodes*), r. plicate when moist. Us. dioecious, not often fruiting. Stem r. radiculose. Leaves sometimes (princ. in *H. exannulatum*) reddish. — Growing in swamps.

4. **Uncinata**. Leaves us. falcate, gen. plicate. Us. monoecious, often fruiting. Stem r. radiculose. Leaves greenish. — Growing on dry stones, base of trees and dry earth, r. in water.

b. Leaves recurved at borders below, subundulate when dry.

IV. **Rhytidium**. Leaves faintly rough above at both sides, falcate or nearly straight; alar (angular) cells small very numerous. Stem without rhizoids and paraphyllia.

B. Leaves with short double or indistinct (in *H. resupinatum* sometimes simple) costa, falcate or (sometimes in *H. cupressiforme*) straight, sometimes (in subg. *Cupressina* and *Campylophyllum*) recurved at borders. Stem sometimes (in *Cupressina*) with paraphyllia. Dioecious or monoecious.

V. **Pseudo-Hylocomium**. Leaves spreading when dry, large denticulate not circinnate, us. plicate below; special alar cells not defined. Stem not or irregularly pinnate, not creeping. Dioecious.

VI. **Campylophyllum**. Leaves spreading when dry, small faintly denticulate subcircinnate not plicate; alar cells small distinct. Stem pinnate creeping. Monoecious.

VII. **Drepanium**. Leaves not spreading when dry, large nearly entire not circinnate, sometimes striate or plicate; alar cells

either large or not well-defined. Stem not plumiform, often irregularly divided. Dioecious or r. monoecious.

VIII. Cupressina. Leaves not spreading when dry, mostly small (in few species large), not r. denticulate and circinnate, not (exc. *H. plicatile* and *H. crista castrensis*) plicate; alar cells gen. distinct r. large. Stem often pinnate. Sometimes monoecious.

a. Leaves (at least the elder of stem) yellow (r. red or brown) at insertion, gen. small, in *Imponentiformia* somewhat large.

aa. Leaves recurved nearly to acumen, often circinnate.

1. **Plicatilia.** Leaves plicate. Stem eradiculose often irregularly divided; paraphyllia none. Capsule long narrow; pedicel long. Dioecious very r. fruiting.

2. **Reptiliformia.** Leaves not plicate. Stem us. creeping and pinnate; paraphyllia r. (in *H. canariense*) present. Capsule not long; pedicel shortish. Monoecious us. fruiting.

bb. Leaves not distinctly recurved and not plicate. Dioecious or monoecious.

3. **Imponentiformia.** Leaves somewhat large often circinnate. Stem pinnate us. with paraphyllia. Habit of *H. cupressiformis*.

4. **Callichroidea.** Leaves small circinnate. Stem often plumiform r. with paraphyllia.

5. **Raphidostegioidea.** Leaves small not circinnate. Stem not regularly pinnate; paraphyllia none.

b. Leaves pale at insertion, often (princ. in *Cupressiformia*) large.

aa. Leaves circinnate. Paraphyllia sometimes numerous.

6. **Molluscoidea.** Leaves not recurved sometimes large. Stem us. plumiform gen. not or sparingly radiculose. Dioecious.

7. **Hamulosa.** Leaves small sometimes recurved. Stem not plumiform, us. creeping; paraphyllia us. broad. Us. monoecious.

bb. Leaves not circinnate. Stem not plumiform; paraphyllia few or wanting.

8. **Cupressiformia.** Leaves short-acuminate often large, sometimes recurved. Stem sometimes pinnate. Dioecious.

9. **Amblystegioidea.** Leaves small long-acuminate not recurved. Stem irregularly divided or subpinnate. Monoecious.

1. **Alaria** C. Mueller mscr.

A. Leaves distant decurrent, more denticulate at base; alar cells large.

1. **H. commutatum** Hedwig.

Leaves from broad-ovate base long-acuminate, gen. striate,

faintly mamillöse above; upper cells narrow, the lower dilated, the alar yellow; costa vanishing in acumen. Capsule large sub-cylindric arcuate; lid rostellate-apiculate; pedicel very long. Perichetial leaves plicate. Tufts loose. Stem pinnate very tomentose; branches distant; paraphyllia numerous. — Wet calcareous places. *Eur.* common below alp. regions. Sweden, Norway, France, Switzerl.! *Amer.* r. »U. S.»: Lesq. et. Jam.

* **H. sulcatum** Schimper.

Stem less regularly pinnate; branches less distant. Leaves smaller, short-decurrent; their costa shorter. Capsule smaller. — Alpine, often not calcareous, stations. *Eur.* somewhat r. Norway, Switzerl.! *Amer.* r. »Greenl.»: Berggren. N. Foundl.: Waghorne.

2. **H. decipiens** Notaris. — Thuidium Not.; Hypnum Kindb.

Differs from *H. commutatum*: Leaves gen. mamillöse on both sides, with broader base and shorter acumen, less striate; alar cells gen. hyaline; cells shorter, those of branch-leaves oval-oblong; costa shorter, faint above. Perichetial leaves shorter, faintly striate. Stem often sparingly tomentose; branches often simple above. Very r. fruiting. — Rivulets, princ. in alps, also in not calcareous districts, gen. r. *Eur.* Sweden, Norway, Switzerl.! *Amer.* Can.: Macoun; Waghorne.

B. Leaves crowded, not decurrent, nearly entire; alar cells not large.

3. **H. falcatum** Bridel.

Leaves from ovate-oblong base long-acuminate, often striate, indistinctly mamillöse, cells sublinear; costa us. vanishing in acumen. Perichetial leaves plicate. Capsule less large than in *H. commutatum*; lid with shorter point. Tufts brown or dark green, often dense. Stem us. irregularly pinnate and sparingly tomentose; branches approached. — Swamps and rivulets princ. in not calcareous alp. stations. *Eur.* common in alps. Sweden, Norway, France, Switzerland! *Amer.* Can. not r.: Macoun.

* **H. irrigatum** Zetterstedt. — *H. virescens* Boulay.

Leaves ovate-lanceolate faintly striate; alar cells us. not well-defined; costa of stem-leaves gen. percurrent. Tufts dirty green. Stem often pinnate, sometimes naked below; paraphyllia few. Very r. fruiting. — Rivulets r. *Eur.* Sweden, Norway, Switzerl.!

II. *Cratoneuron* Sullivant, in part.

1. **H. filicinum** L. — *Amblystegium* Notaris.

Leaves minutely denticulate all around; alar cells large us. hyaline; costa not thin in the acumen, sometimes excurrent.

Stem-leaves subovate acuminate decurrent. Branch-leaves narrower, gen. more crowded; cells suboblong. Perichetial leaves gen. not striate. Capsule subcylindric arcuate, smaller and shorter-pedicellate than in *H. commutatum*. Tufts us. dense and dirty green. Stem often creeping; branches us. crowded; paraphyllia often present. Dioecious. — Wet places, common. *Eur.* Sweden, Norway, Germany, Switzerl.! *Eur.* Can. Macoun.

* *H. curvicaule* Juratzka.

Leaves gen. not falcate; alar cells yellow; stem-leaves short-acuminate. Stem nearly eradicolose. — Alps r. *Eur.* Norway: Bryhn; E. Nyman. Austria: Breidler. Switzerl.: Culmann.

* *H. Vallis-clause* Bridel. — Hypnum Formianum Schimper.

Leaves long-acuminate; cells less dilated; costa excurrent. Stem long, often denudate below and covered by persistent nerves. — Running water r. *Eur.* »France»: Boulay. »Italy»: Schimp. syn.

* *H. fallax* Bridel. — Amblystegium irriguum var. spinifolium Schimper.

Upper leaves ovate-lanceolate long-acuminate nearly entire; costa excurrent. Stem as in the last. — Running water r. *Eur.* Sweden! Engl.: Rogers. Germany: Roemer.

5. *H. fluviatile* Swartz. — Amblystegium Br. eur.

Leaves gen. entire, ovate-oblong or ovate-lanceolate, acute or short-acuminate, not or indistinctly decurrent, us. not falcate and not distant, dark green; cells lanceolate-oblong, the small alar gen. not much distinct; costa subpercurrent. Capsule as in the last. Stems not or sparingly radiculose, gen. irregularly divided and not tufted; branches long; paraphyllia none. Very r. fruiting. — Inundated rocks. *Eur.* not r. Sweden, Germany! *Amer.* Can.: Macoun. U. S. r.: Austin.

* *H. irriguum* Hooker et Wilson. — Amblystegium Br. eur.

Leaves sinuolate-denticulate, from subovate base long-acuminate, subdecurrent, somewhat distant and patent; alar cells distinct; costa subexcurrent. Stem us. rigid when dry. — *Eur.* not common. Sweden, Germany, Switzerl.! *Amer.* Can.: Macoun; Waghorne. U. S.: Austin.

III. Harpidium Sullivant.

1. Riparia.

6. *H. riparium* L. — Amblystegium Br. eur.

Leaves ovate-lanceolate gradually acuminate sometimes filiform-pointed, entire, scarcely decurrent, us. distant and large; middle cells, also often the upper, narrowly linear; costa r. percurrent.

Capsule large arcuate; annulus broad; lid subobtuse; pedicel long. Tufts us. green. — Gen. common, r. in alp. regions. *Eur.* Sweden, Switzerl. *Amer.* Can.: Macoun. U. S.: Roell.

* **H. longinerve** Kindb. cat. Can. m.

Leaves mostly curved; costa gen. long-excurrent. Tufts sometimes brown. — Rare. *Amer.* Can.: Macoun.

* **H. Kochii** Br. eur. — *H. curvipes* Guembel; *Amblystegium* Schimp. syn.

Leaves oval-oblong gen. straight; middle cells lanceolate. — Rare. *Eur.* France: Berthoumieu. *Amer.* Can.: Macoun.

7. **H. vacillans** Sullivant. — *Amblystegium* Sull. icon. m.; *Hypnum* Lesq. et Jam.

Differs from *H. riparium*: Leaves not large, those of branches often obtusate with oblong apical cells, the perichetial with excurrent costa. Capsule small more strangulate; lid obtuse; pedicel thin and short. — R. *Eur.* France, Calvados: Brébisson (Husnot M. Gall. n. 393). *Amer.* Can. Owen Sound: Macoun. U. S.: Roell; N. Jersey: com. Macoun.

2. *Revolventia*.

8. **H. revolvens** Swartz.

Leaves circinnate, from short subovate base narrowed to the longer acumen, not striate, entire and not decurrent, us. reddish; cells linear exc. the wider (lower) basal; costa gen. vanishing below acumen. Capsule large arcuate; annulus broad; lid apiculate; pedicel gen. long. Stem irregularly pinnate. Monoecious not r. fruiting. — Alpine princ. northern districts. *Eur.* Norway (common)! Sweden: Lindberg; M. Huss. England: Holt. France: Husnot. *Amer.* r. Alaska: J. M. Macoun. Greenl.: Berggren; Vanhoeffen. Can.: Macoun; Waghorne.

9. **H. Cossoni** Schimper. — *H. intermedium* Lindb.

Differs from the last: Leaves not circinnate, their acumen not longer than the us. subovate base. Tufts green or brown-yellow. Dioecious r. fruiting. — *Eur.* princ. in northern districts. Sweden, Norway, Switzerl. *Amer.* r. Can.: Macoun.

* **H. vernicosum** Lindberg.

Leaves shorter and broader, short acuminate, striate when dry; costa often short. Stem us. pinnate. Tufts us. yellowish. — *Eur.* Sweden! Lindberg. Norway! *Amer.* r. Can.: Macoun.

* **H. rigidum** Kindb. enum. bryin. dovr. (as var.)

Leaves larger with narrowly ovate-oblong base, brown-green. Stem somewhat rigid when dry. Capsules not found. — Alp. region r. *Eur.* Norway!

3. *Adunca*.

A. Tufts densely cohering. Leaves not decurrent; alar cells small or indistinct. Dioecious r. fruiting.

a. Angular leaf-cells finally red, the alar often distinct; costa often short and double.

10. *H. Bambergeri* Schimper. — *H. brevifolium* Lindb.; *H. flexuosum* Berggren.

Leaves falcate, from ovate or broad-ovate base tapering to a longer or shorter acumen, entire and crowded; upper cells linear. Capsule arcuate not large; lid apiculate; pedicel not long. Tufts either green, sometimes glossy, or brown-green or brown-red. — Swamps and wet rocks in alps r. *Eur.* Norway!; *E. Adlerz* (fruiting). *Amer.* »Greenl.»: Berggren. »Can.»: Lesq. et Jam.

b. Alar leaf cells nearly indistinct, not red; costa simple.
11. *H. elodes* Spruce. — *Amblystegium* Schimper.

Leaves small us. straight, more or less distant; cells linear; costa vanishing in acumen, not thick. Stem-leaves from short broad base short-cuspidate or filiform-pointed, faintly denticulate below. Branch-leaves narrowly ovate-lanceolate long-cuspidate, faintly denticulate nearly all around, sometimes falcate. Capsule small oblong-cylindric curved; pedicel short. Tufts blackish or dark green, sparingly radiculose. — *Eur.* gen. r. Sweden, Norway!

* *H. densum* Milde. — *Brachythecium* Juratzka.

Leaves smaller, more distinctly denticulate; cells often suboblong; costa subexcurrent. Capsules not seen. — *Eur.* r. Austria: Juratzka, and Germany: Arnold (herb. Hartman), com. Acad. Upsal.

12. *H. subsecundum* Kindb. rev. bryol. 1895.

Leaves not large, nearly crowded, entire; cells linear, the lower basal yellow; costa vanishing below acumen. Stem-leaves from broad-ovate base short-acuminate; costa very thick. Branch-leaves from subovate base (more or less gradually) long-subulate, subsecund when dry; costa thinner. Capsule arcuate; pedicel short; teeth brownish. Stem creeping. — *Amer.* r. Can.: White, com. Macoun; N. Foundl.: Waghorne.

B. Tufts loose eradiculose. Leaves not or shortly decurrent, gen. falcate; alar cells small, other cells linear. Capsule annulate. Dioecious r. fruiting.

a. Leaves plicate when dry, not decurrent. Stem irregularly divided.

13. *H. lycopodioides* Schwægrichen.

Leaves entire large crowded shining; costa reaching to the acumen, often brown. Stem-leaves from subovate or ovate-oblong base tapering to a shorter, subulate filiform-pointed acumen. Branch-leaves gen. ovate-lanceolate longer-acuminate. Capsule large arcuate; teeth pale; pedicel 3—5 c. m. long. Tufts yellowish or brown. — Gen. r. *Eur.* Sweden! England: Holt. France: Husnot. *Amer.* »Greenl.»: Berggren. »U. S.»: Lq. et Jam.

b. Leaves short-decurrent not plicate. Stem us. subpinnate.

14. *H. aduncum* L.; Hedwig; Schimper.

Leaves crowded not large, from subovate base tapering to a longer sometimes denticulate acumen, r. ovate-lanceolate. Capsule small; pedicel not long. Tufts green or yellowish. — *Eur.* probably not r. Norway fruiting! Germany: Schimper (com. as »the typical *H. aduncum*»). *Amer.* r. U. S. Roell. Can.: Macoun; Waghorne.

15. *H. Wilsoni* Schimper.

Leaves distant large, from ovate lanceolate base tapering to a shorter gen. entire acumen. Capsule large slightly curved; pedicel very long. Tufts dusky green. — R. *Eur.* Engl. Southport near sea, fruiting: G. A. Holt; T. Rogers. Sweden, isl. Gothland: Zetterstedt, com. E. Haglund. *Amer.* U. S.: Roell.

C. Tufts loose eradiculose. Leaves long-decurrent not striate, often not falcate; alar cells large.

a. Capsule large not (exc. *H. capillifolium*) annulate; pedicel very long. Leaves gen. long and narrow; cells linear exc. the alar; costa us. long. Sometimes monoecious, less r. fruiting.

16. *H. fluitans* L.

Leaves from narrowly ovate-oblong or ovate-lanceolate base tapering to a gen. longer acumen, us. entire and green. — *Eur.* common below alps, r. in alp. regions. Sweden, Norway! *Amer.* Can.: Macoun. Greenl.: Berggren.

17. *H. capillifolium* Warnstorf.

Differs from the last: Costa of leaves gen. long-excurrent. »Capsule annulate»: Renauld. — *Eur.* r. Norway! Germany: Warnstorf.

18. *H. exannulatum* Guembel.

Leaves from ovate-lanceolate base tapering to a gen. shorter acumen, us. denticulate below and reddish or brown, r. green, often very distant. — *Eur.* common in northern districts, princ. in alp. regions, r. in southern districts. Sweden, Norway! *Amer.* Can. not r.: Macoun; Waghorne. Greenl.: Berggren.

* **H. pseudo-stramineum** C. Mueller.

Leaves green entire often straight; those of branches often with oblong apical cells. Capsules not seen. — *R. Eur.* Sweden: E. Adlerz. Germany: Milde. *Amer. Can.*: Waghorne.

b. Capsule annulate not large; pedicel often short. Leaves often short and broad; cells often dilated; costa mostly short. Dioecious *r.* fruiting. Tufts not reddish.

19. **H. Kneiffii** Schimper.

Leaves entire (or minutely denticulate above), from subovate or broad-ovate base tapering to a gen. longer but broad and short-subulate acumen, *us.* small and distant; cells often dilated; costa *us.* short, sometimes bifid. Capsule more or less arcuate; pedicel 2—5 c. m. long. Tufts green. — *Eur.* not *r.* Sweden, Norway! *Amer. Can.*: Macoun.

* **H. Sendtneri** Schimper, in part; Boulay.

Leaves larger less distant, *us.* brown-green; cells *gen.* narrow, the alar often yellowish. — *Eur.* Sweden!; C. O. Hamnström (determ. Lindberg); E. Adlerz. *Amer. r. Can.*: Macoun.

20. **H. conflatum** C. M. et Kindb. cat *Can. m.*

Leaves small distant denticulate all around; those of stem from round-ovate base tapering to a shorter subobtuse acumen; branch-leaves oblong-lanceolate; cells *gen.* dilated; costa *gen.* vanishing in acumen, sometimes indistinct. Capsule smaller than in the last, strangulate; lid low apiculate; pedicel very long and capillary. Tufts green. — *Amer. r.* Alaska: J. M. Macoun. *Can.*: Macoun, *Canad. m. n.* 334; Waghorne.

21. **H. hamifolium** Schimper.

Leaves large crowded entire, from ovate-oblong base tapering to a longer narrow-subulate acumen; cells linear; costa long. Tufts yellowish. Branches robust, rigid when dry. Capsules unknown. — *Eur. r.* Germany near Breslau: Schulze, com. Warnstorf. *Amer. »U. S.»*: Renaud.

4. *Uncinata.*

A. Leaves not recurved, entire at least below.

22. **H. uncinatum** Hedwig. — *H. aduncum* Lindb.

Leaves short-decurrent from narrowly ovate base tapering to an often filiform-pointed acumen, *us.* striate; alar cells large, the others linear; costa *us.* long. Capsule cylindric arcuate or nearly straight, strangulate; lid apiculate; pedicel *us.* 3—4 c. m. long. Tufts *us.* green and eradiculose. Stem often pinnate. Monoecious *us.* fruiting. — *Gen.* common. *Eur.* Sweden, Nor-

way, Germany, Switzerl. *Amer.* Can.: Macoun; Waghorne. Greenl.: Berggren. U. S.: Howell, com. Cardot.

* **H. Moseri** Kindb. cat. Canad. m.

Stem creeping. Leaves small gen. not striate; costa thin often obsolete. Capsule small; pedicel us. short. — *Amer.* Can.: (N. Brunsw., Labrador and N. Foundl., frequent); Moser; Waghorne. *Eur.* Sweden: E. Nyman.

23. H. orthothecioides Lindberg

Differs from *H. uncinatum*: Leaves not decurrent, gen. with broader base, often straight; alar cells gen. small. Dioecious. Tufts us. yellowish. Capsules and female flowers unknown. — Earth and rocks in northern districts. *Eur.* not r. in arctic districts. Spetsbergen: Berggren. Sweden: Arnell. Finland: Brotherus. *Amer.* Alaska: J. M. Macoun. Can.: Waghorne.

B. Leaves recurved, denticulate nearly all around (at least those of branches). Dioecious.

24. H. erythrorhizon Schimper. — *Brachythecium* Sch.; *Hypnum* Hartman.

Leaves faintly striate crowded decurrent not large, often corrugate when dry; alar cells hyaline somewhat large, the others lanceolate-oblong; costa reaching to acumen. Stem-leaves nearly entire from ovate or ovate-oblong base abruptly long-acuminate, faintly but broadly recurved nearly to acumen. Branch-leaves broadly ovate-lanceolate faintly denticulate nearly all around. Capsule not large suboblong or arcuate; lid acute; pedicel short smooth. Stem subpinnate creeping. Tufts not glossy pale green or green. — Granite rocks in woods in northern districts r. *Eur.* Sweden: Aongstroem; Arnell; J. Persson. *Amer.* »U. S.» Cardot

* **H. Thedenii** (Hartman as var.) Br. eur. — *Brachythecium* Br. eur.; *Hypnum* (Hartman) Kindb.

Leaves subplicate less crowded. Stem longer, more regularly pinnate. Capsule oval. — Rocks r. *Eur.* Sweden: K. F. Thedenius, com. R. Hartman. *Amer.* »U. S.» James.

25. H. harpidioides C. M. et Kindb. — *Brachythecium* Cat. Can. m.

Differs from *H. erythrorhizon*: Leaves plicate distinctly denticulate all around and more distinctly falcate, from ovate base subulate-acuminate recurved to acumen; alar cells large green, the others lanceolate. Capsule round-oval; pedicel slightly rough above. Stem not creeping. — Logs in woods r. *Amer.* Can.: Macoun; Moser.

IV. Rhytidium Sullivant.

26. **H. rugosum** Ehrhart.

Leaves large denticulate nearly all around from subovate base gen. long-subulate; costa vanishing near or above middle. Capsule subcylindric arcuate; teeth ferruginous; lid acute or rostellate; pedicel not long. Tufts loose, brown below, golden glossy or greenish above. Branches subulaceous very thick. Dioecious r. fruiting. — Dry earth and rocks. *Eur.* common in alps, r. in lower districts. Norway fruit., Switzerl.! Germany fruit.: Schimper. *Amer.* Can.: Macoun; Waghorne.

V. Pseudo-Hylocomium Kindb.

A. Angular leaf-cells large numerous hexagonal-oval.

27. **H. squarrosus** L. — Hylocomium Br. eur.

Leaves minutely denticulate all around from ovate base long-acuminate; angular cells sometimes brown. Perichetial leaves pale yellow gradually acuminate filiform-pointed, rate above middle of the basal part. Capsule broad-oval or obovate or curved us. not large; teeth brown-yellow; cilia often appendiculate; lid acute; pedicel very long. Stem eradiculose r. pinnate. Tufts us. dirty greenish. — Humid meadows. *Eur.* gen. common below alp. regions. Sweden, Switzerl.! *Amer.* not common. Alaska: J. M. Macoun. Can.: J. Macoun. U. S.: Roell (forma subpinnata).

B. Angular leaf-cells suboblong small not well-defined.

28. **H. loreum** L. — Hylocomium Br. eur.

Leaves from ovate base long-acuminate. Stem-leaves entire below middle; branch-leaves denticulate nearly all around. Perichetial leaves hyaline, slightly denticulate above. Capsule large oval or subglobose; teeth brown; cilia not appendiculate; pedicel long. Stem often very long and decumbent; branches radiculose. — Earth and rocks princ. near sea or larger us. not r. *Eur.* Sweden, Norway, Germany! *Amer.* Alaska: J. M. Macoun. Can.: Macoun; Dawson.

29. **H. robustum** Hooker. — Hylocomium Flemmingii Austin.

Leaves ovate short acuminate denticulate, rugose when dry, larger than in the both last and less curved; the younger narrower, the elder often covered by hair-like rhizoids. Capsule large subobovate oblique or slightly curved; teeth yellow or finally ferruginous; lid conic obtuse; pedicel shortish. Stem suberect; branches few distant very thick us. green. Habit of *Hypnum rugosum* but larger. — Earth in woods r. *Amer.* western slope. Can.: Macoun. U. S.: Leiberg, com. Mrs Britton.

VI. *Campylophyllum* Schimper.

30. **H. Halleri** L. fil. — *H. Macounii* Kindb. bull. Torr. club XVII.

Leaves faintly denticulate nearly all around, from suboval suberect recurved base acuminate; alar cells not numerous, the others oblong-lanceolate or sublinear. Branch-leaves more distinctly denticulate. Capsule small narrow cylindric more or less curved, faintly constricted; lid obtuse; pedicel not long. Tufts dense often brown. — Rocks princ. calcareous. *Eur.* nearly common in dolomitic alps. Sweden, Norway, Switzerl.! *Amer.* r. Can.: Macoun; Drummond. N. Foundl.: Wagborne.

VII. *Drepanium* Schimper, in part.

A. Leaves finally yellow at insertion.

a. Leaves decurrent falcate not undulate.

31. **H. curvifolium** Hedwig; Sullivan icon. musc.

Leaves nearly entire, faintly striate; alar and lowest basal cells nearly uniform more or less dilated but not large, the others linear. Stem-leaves subovate short-acuminate; branch-leaves ovate-oblong or ovate-lanceolate acuminate acute. Capsule large subobovate or arcuate, strongly striate and not stragulate when dry; teeth yellow; cilia not appendiculate; pedicel thick, 5—6 c. m. long. Stem gen. pinnate, not or very sparingly radiculose; branches straight faintly compressed. Tufts green. Pseudo-monoeious not r. fruiting. — On decayed logs in shady woods. *Amer.* common. Can.: Macoun; Moser. U. S.: Sullivan, com. C. Mueller; Fitzgerald, com. Renauld. *Macoun*

32. **H. pseudo-drepanium** C. M. et Kindb. cat. Can. m.

Differs from the last: Leaves entire plicate less distinctly decurrent, shorter acuminate; alar cells large. Stem irregularly divided; branches long turgid arcuate at apex. Capsule as in the last. — Logs in woods r. *Amer.* Can.: Macoun.

33. **H. Renauldi** Kindb. cat. Canad. m.

Differs from *H. curvifolium*: Leaves gen. entire; alar cells large. Stem not pinnate; branches more compressed or complanate. Capsule faintly striate. Habit of *H. pratense*. — On rocks or sand r. *Eur.* Norway in Dovrefjeld and Gudbrandsdal etc.! *Amer.* Can.: Macoun.

b. Leaves not or slightly decurrent, often undulate and straight; lowest basal cells suboval nearly similar.

34. **H. pratense** Koch.

Leaves gen. entire and not striate, often straight, less crowded than in *H. curvifolium*, undulate when dry; cells linear except

the lowest basal. Stem-leaves subovate with often subulate acumen; branch-leaves ovate-lanceolate. Capsule small stragulate not striate; pedicel thin 3—5 c. m. long. Stem flaccid not pinnate and not creeping; branches complanate often long and simple, sometimes loosed from the stem. Tufts often whitish green. Habit of *Plagiothecium undulatum*. Dioecious or pseudo-monoecious, very r. fruiting. — Swamps and wet meadows r. *Eur.* Sweden and Norway!; E. Nyman (fruiting). Germany: Schimper (fruit.). *Amer. Can.*: Macoun; Drummond n. 196; Moser.

* **H. subflaccum** C. M. et Kindb. cat. Can. m.

Leaves striate gen. ovate-oblong, denticulate above to $\frac{1}{4}$, straight; those of stem short-decurrent; alar cells more distinct. Tufts green. Capsules unknown. — Swamps r. *Amer. Can.*: Macoun.

35. H. pseudo-pratense Kindb. cat. Can. m.

Differs from *H. pratense*: Leaves not undulate, more crowded and more distinctly denticulate above. Stem creeping; branches short; tufts very dense and green. Monoecious. Capsules unknown. — Logs in woods r. *Amer. Can.*: Macoun.

B. Leaves pale not yellow at insertion, decurrent and not undulate. Branches not compressed.

36. H. Lindbergii Mitten. — *H. arcuatum* Lindb., non Sulliv.

Leaves as in *H. curvifolium* but gen. entire; alar cells large hyaline. Capsule large curved strongly plicate not stragulate; teeth yellow; cilia long-appendiculate; pedicel thick 5—6 c. m. long. Stem irregularly divided eradiculose. Tufts us. dirty green. Dioecious very r. fruiting. — On clayey earth. *Eur.* not r., nearly common in northern districts. Sweden!; S. O. Lindberg; E. Collinder (fruiting). Norway!; E. Nyman (fruit.). Switzerl., Italy! *Amer. r. Can.*: Macoun; Moser; Waghorne.

37. H. arcuatiforme Kindb. cat. Canad. m.

Differs from the last: Leaves shorter, ovate-oblong. Capsule small stragulate not striate; teeth pale yellow; pedicel 3 c. m. long. Stem subpinnate creeping. Agrees with the last in appendiculate cilia of endostome. Habit of *H. cupressiforme*. — On earth in woods r. *Amer. Can.*: Macoun.

VIII. *Cupressina* C. Mueller, in part.

1. *Plicatilia*.

38. H. plicatile Mitten. — *Stereodon* Mitt.; *Hypnum* Lesq. et Jam.

Leaves not decurrent; upper cells lanceolate, alar small finally

hyaline, the others oblong. Stem-leaves suboval short-acuminate entire. Branch-leaves from oval-oblong base tapering to an often longer and serrulate, sometimes circinnate acumen. Capsule cylindric-oblong more or less curved, finally striate, somewhat large; lid acute. Tufts brown-green. Branches subjulaceous. R. fruiting. — Rocks in alp. region r. *Eur.* Norway less r. Austria: Milde. France: Boulay. Spetsbergen: R. Gyllencreutz. *Amer.* Can. fruiting: Macoun. U. S.: Roell, com. Cardot. ***H. revolutum** Mitten. — *Stereodon* Mitt.; *Hypnum* Lindberg; *H. Heufleri* Juratzka, in part.

Leaves not circinnate, those of branches shorter-acuminate often entire. Capsules not seen. — *Eur.* Norway!

2. *Reptiliformia*.

A. Stem pinnate creeping; paraphyllia wanting or very few. Branch-leaves denticulate; inner basal cells yellow.

a. Stem-leaves entire at least below. Capsules and leaves somewhat large. Tufts green.

39. H. reptile Michaux; Schimper. — *Leskea pallescens* Hedwig; *Hypnum* Beauvois; C. Mueller.

Stem-leaves entire or ovate-oblong short-acuminate or filiform-pointed; branch-leaves narrowly ovate-oblong or ovate-lanceolate, entire above and at acumen, often circinnate; alar cells small distinct finally brown-orange, impressed at angles on a short-triangular space; the others sublinear. Capsule pale red; teeth pale yellow; segments subhyaline; lid short-pointed; pedicel not long. — Trees and stumps not r. *Eur.* Sweden, Switzerl. Germany: Milde. Austria: Progel. *Amer.* Can.: Macoun; Moser; Waghorne.

40. H. reptiliforme Kindb. revue bryol. 1895.

Differs from the last: Leaves larger, long-acuminate; those of stem ovate-oblong denticulate above, those of branches ovate-lanceolate denticulate all around; alar cells large hyaline. Capsule pale yellow; segments yellow; lid not seen; pedicel longer. — *Amer.* r. Can.: Macoun.

b. Leaves denticulate all around.

aa. Branches subjulaceous us. brown. Leaves short; cells somewhat wide.

41. H. perichætiale Br. eur.

Leaves subovate acute or sometimes short-acuminate; alar cells small dusky on a narrow-triangular space, the others lanceolate-oblong. Capsule finally brown; pedicel short. — Rocks r. *Eur.* Norway: Kaurin. *Amer.* Can.: Macoun.

bb. Branches green not julaceous. Branch-leaves long often circinnate; cells narrow.

42. *H. pseudo-fastigiatum* C. M. et Kindb. cat. Can. m.

Stem-leaves broad-ovate abruptly narrowed to a long filiform point, decurrent; branch-leaves ovate-lanceolate; alar cells small distinct finally brownish. Capsule pale red; lid rostellate; pedicel short. — Trees r. *Eur.* Norway near Lillehammer! Sweden: H. Nordenström. *Amer. Can.*: Macoun.

43. *H. micro-reptile* Kindb. revue bryol. 1895. — *H. reptile* C. M. syn., not Michaux; *H. pallescens* Schimp. syn., not Beauvois, also not *Leskea pallescens* Hedwig.

Leaves and capsules smaller than in the 4 last species. Leaves ovate-lanceolate circinnate with long subulate acumen; alar cells small few hyaline. Capsule finally brown; lid and pedicel as in the last. — Rocks and trees. *Eur.* r. Germany: Milde. *Amer.* not r. Can.: Macoun; Moser; Fowler; Waghorne. U. S.: Green, com. Cardot.

B. Stem irregularly divided sparingly radiculose; paraphyllia filiform numerous. Branch-leaves gen. entire below acumen; lower basal cells often pale finally orange.

44. *H. canariense* Mitten. — *Stereodon* Mitt.; *Hypnum* Kindb.; *H. Waghornei* Kindb. cat. Canad. m.

Leaves long-acuminate ovate-lanceolate circinnate; alar cells small dusky numerous, the others narrow. Capsules not seen; pedicel not long. — Trees and humid rocks r. *Eur.* Irel. near Killarney: Lindberg, com. Braithwaite. *Amer.* N. Foundl.: Waghorne.

3. Imponentiformia.

A. Tufts nearly eradiculose us. brown. Leaves dark-brown at insertion, long-acuminate; alar cells not large. Capsule narrow; lid long-conic rostellate. R. fruiting.

45. *H. imponens* Hedwig.

Leaves us. not recurved; alar cells on a short-triangular space, the others linear. Stem-leaves entire from ovate base abruptly narrowed; branch-leaves denticulate at acumen. Capsule cylindric often nearly straight; teeth yellow; cilia appendiculate. Paraphyllia broad. Stem brown. Dioecious. Differs from *H. cupressiforme* in often circinnate leaves and their brown cells at insertion. — Rocks and logs in woods. *Eur.* r. Sweden less r., Germany, Switzerl.! Engl.: Holt. *Amer.* («common»: Lesq. et Jam.). Can.: Macoun.

B. Stem us. creeping. Tufts us. green. Capsule thick; lid

short-conic not rostellate. Leaves often short-acuminate; alar cells large, basal not brown. Often fruiting. Leaves larger than in the last.

46. *H. fertile* Sendtner.

Stem brown or brown-red; paraphyllia narrow. Leaves recurved below; alar cells somewhat numerous finally hyaline on a short triangular space, inner lower basal gen. pale yellow. All leaves entire or denticulate only above, from ovate base nearly gradually narrowed; those of branches filiform-pointed. Capsule suboblong arcuate not striate; teeth yellow above, brown below; cilia not appendiculate; lid short-pointed. Monoecious. — Earth and logs in woods r. *Eur.* Germany (Wuerttemberg!); Milde. Switzerl.: Roell. Norway: E. Nyman 1893. *Amer. Can.*: Waghorne. U. S.: Roell.

47. *H. canadense* Kindb. in bull. Torr. club XVII.

Stem gen. green; paraphyllia sometimes broad. Leaves gen. not recurved; alar cells very few (one or two) hyaline impressed below the arrounded basal angles, inner basal (at insertion) finally dark-yellow. Stem-leaves entire or at acumen indistinctly sinuate, from ovate-oblong base gradually narrowed to a short acumen, sometimes striate. Branch-leaves ovate-lanceolate denticulate nearly all around. Capsule subovate or arcuate finally striate; teeth orange; cilia us. appendiculate; lid muticous. Dioecious. — Logs. *Amer.* not r. Alaska: J. M. Macoun. *Can.*: J. Macoun; Moser; Waghorne. U. S.: Prof. A. G. Wetherby.

4. Callichroidea.

A. Leaves denticulate. Stem creeping; paraphyllia numerous. Monoecious.

48. *H. circinnale* Hooker.

Leaves marked with orange stripes, red at insertion; lowest basal cells suboval, alar red subquadrate somewhat large on a nearly round space, the others linear. Stem-leaves nearly entire from ovate-oblong base tapering to a shorter acumen; branch-leaves ovate-lanceolate serrulate above, nearly entire near base. Capsule suboval or subobovate; teeth orange; segments pale yellow; lid apiculate; pedicel often longish. Stem red; branches plumiform. Tufts yellowish or green. Habit of *H. molluscum*. — Logs r. *Amer. Pacif.* distr. less r. *Can.*: Macoun. U. S.: Henderson, com. Cardot. *Eur.* »Irel.«: Cardot in revue bryol.

49. *H. Sequoieti* C. Mueller.

Leaves narrow ovate-lanceolate long-acuminate often denticulate below and serrulate above, yellow at insertion; alar cells few

round-oval not well-defined, the others linear. Capsule oval-oblong; teeth pale yellow; segments hyaline; lid apiculate; pedicel short. Tufts green. Habit of *H. cupressiforme* (but with small leaves). Differs from *H. circinnale* in brown or green longer us. irregularly pinnate stem, not horizontally patent branches and not striped leaves. — Trees r. Amer. Can.: Macoun; Waghorne.

B. Leaves entire or (sometimes in *H. Dieckii*) at acumen slightly denticulate; alar cells hyaline somewhat large. Stem not creeping; paraphyllia none. Dioecious r. fruiting. Capsule large.

50. *H. callichroum* Bridel.

Leaves long-acuminate subdecurrent faintly striate above; alar cells on a short-triangular space, the others linear. Stem-leaves from broad-ovate base abruptly narrowed; branch-leaves gradually tapering. Capsule cylindric arcuate; lid short with very short point; pedicel long. Tufts green or yellowish. Branches often plumiform. Habit of *H. molluscum*. — Humid grassy places princ. in alp. region r. Eur. Sweden: E. Adlerz. Norway: R. Hartman. Finl.: Brotherus. Engl.: Holt. France: Husnot. Germany: Boulay. Austria: Juratzka. Spetsbergen: Berggren. Amer. Greenl.: Berggren.

51. *H. Dieckii* Renauld et Cardot.

Leaves from subovate base acuminate; cells linear-lanceolate exc. the alar. Tufts green. Stem irregularly divided. Habit of *Calliergon montanum*. — Amer. r. U. S.: Roell, com. Cardot.

5. Raphidostegioidea.

A. Leaves denticulate. Stem radiculose subpinnate; branches compressed.

52. *H. Jamesii* Sullivant. — *Rhynchostegium* Sull. ic. m.; *Hypnum* Lesquereux et James.

Leaves entire below, denticulate above, subabruptly tapering to a subulate often filiform-pointed acumen; alar cells few subquadrate not large, the others linear. Stem-leaves with broad-ovate base; branch-leaves ovate-oblong. Perichetial leaves with subulate acumen and sometimes with filiform point, denticulate below it. Capsule suboblong nearly straight; lid rostellate; pedicel short. Tufts green not glossy. Monoecious. Habit of *Raphidostegium recurvans*. — Trees r. Amer. Can.: Macoun.

53. *H. pseudo-recurvans* Kindb. — *Raphidostegium* note on Can. bryol. 1893.

Differs from the last: Leaves denticulate all around, ovate-

lanceolate long-acuminate gradually tapering to a filiform point. Perichetial leaves entire below the long linear point. Capsule obovate. Tufts olivaceous sparingly radiculose. Lid of capsule and male flowers not seen. Habit of *H. cupressiforme*. — Wet rocks r. *Amer. Can. Brit. Col.: Macoun.*

B. Leaves entire. Stem eradiculose irregularly divided; branches not compressed. Capsules unknown.

54. *H. pseudo-complexum* Kindb. revue bryol. 1895.

Leaves not appressed when dry; upper cells lanceolate, lower oblong, angular (alar) suboval small not well-defined. Stem-leaves ovate or ovate-oblong. Branch-leaves ovate-lanceolate longer-acuminate often falcate. Tufts dense pale green. Resembles a var. of *H. molluscum* in habit. — Arctic district r. *Amer. Alaska: J. M. Macoun.*

6. Molluscoidea.

A. Leaf-cells more or less sinuous (with crenulate walls). Tufts eradiculose.

a. Leaves small entire not plicate. Stem irregularly divided.

55. *H. condensatum* Schimper; Husnot.

Leaves from ovate base long-subulate, not decurrent; upper cells linear, the angular yellow irregular oblong-rectangular or subquadrate. Capsules unknown. Tufts dense pale green. — Wet places in alp. region r. *Eur. Germany: Milde.*

b. Leaves us. large, denticulate above, plicate. Stem plumiform.

56. *H. crista castrensis* L.

Leaves ovate-lanceolate gradually long-acuminate decurrent; alar cells small few nearly indistinct, the others linear. Capsule large not striate; annulus narrow; lid short-apiculate; pedicel long. Tufts loose bright green, finally whitish. Stem rigid; paraphyllia narrow. — Stones in woods princ. coniferous. *Eur. common in northern distr., r. in alp. regions. Sweden, Norway! Amer. Can.: Macoun. U. S.: Wetherby.*

B. Leaf-cells not sinuous. Leaves not or faintly striate. Stem us. plumiform.

a. Stem gen. sparingly radiculose; paraphyllia us. broad. Leaves small.

57. *H. molluscum* Hedwig.

Leaves denticulate below, serrulate above, not or indistinctly decurrent; angular cells small numerous hyaline round-oval, special alar few not well-defined. Stem-leaves from broad-cordate base abruptly acuminate. Capsule suboval; annulus broad;

lid acute or apiculate; pedicel short. Tufts us. green. Stem soft sometimes irregularly divided, not r. eradiculose. — Dry princ. calcareous rocks and earth. *Eur.* nearly common. Sweden (wanting in not calcareous alps), Switzerl., Spain! *Amer.* not common. Can.: Macoun; Waghorne.

58. *H. molluscoides* Kindb. revue bryol. 1895.

Leaves nearly entire, distinctly decurrent; alar cells somewhat large well-defined. Capsule small cylindric arcuate. Otherwise as the last. — On logs r. *Amer.* N. Foundl.: Waghorne.

59. *H. Alaskæ* Kindb. note on Can. bryol. 1893.

Leaves entire subdecurrent gradually acuminate; alar cells large hyaline well-defined. Capsule subovate or arcuate; pedicel short. Tufts green or pale yellow. Stem creeping subpinnate or plumiform. — On trees r. *Amer.* Alaska: J. M. Macoun. Can.: Moser; N. Foundl.: Waghorne.

b. Stem eradiculose without paraphyllia. Leaves gradually acuminate, often large.

60. *H. procerrimum* Molendo.

Leaves large entire or near the cordate base indistinctly sinuate, not distinctly decurrent; cells as in *H. molluscum* but the alar finally brown. Capsules unknown. Tufts green or brown-green. Stem somewhat rigid. — Rocks in alp. regions r. *Eur.* Norway in Dovrefjeld 1862! Switzerl.! Austria: Breidler. France: Boulay.

61. *H. subplumiferum* Kindb. bull. soc. bot. ital. 1895.

Leaves large, ovate at base, serrulate all around and subdecurrent; alar cells hyaline well-defined somewhat large. Capsules unknown. Tufts brown-green. — Rocks in alp. region r. *Eur.* Switzerl. near Goeschenen: Kindb. and Roell.

62. *H. plumiferum* Mitten. — *H. cristula* Kindb. bull. Torr. club XVII.

Leaves somewhat large, ovate at base, entire at least below the to an us. long filiform point tapering acumen, sometimes subdecurrent; alar cells few gen. not well-defined. Capsule large narrow subcylindric nearly straight; teeth pale yellow below, hyaline above; lid conic obtuse; pedicel somewhat long. Perichetial leaves faintly striate, abruptly narrowed to the filiform point. Tufts brown-green or green. — Rocks and trees in oak-woods r. *Amer.* princ. in Pacif. distr. Can. Vanc. isl.: Macoun. U. S.: Roell.

* *H. subimponens* Lesq.; Sulliv. icon. musc.

Leaves smaller gen. nearly entire at the subulate acumen.

Capsule more curved; lid acute often apiculate. — *Amer. r.* Can. Brit. Col.: Macoun; N. Brunsw.: Moser. U. S.: Bolander, herb. Lesquereux, com. C. Mueller and J. Cardot.

7. *Hamulosa*.

A. Stem-leaves distant. Tufts loose eradiculose.

63. *H. filiforme* Kindb. revue bryol. 1895.

Leaves ovate with short subulate or longer and filiform point, faintly denticulate at acumen; those of stem recurved at one side; upper cells lanceolate, lower oblong, alar few hyaline. Tufts green. Stem long pinnate; branches distant; paraphyllia broad very few. Capsules unknown. Dioecious. — Rocks r. *Amer.* Can. Rocky mts: Macoun.

B. Leaves crowded. Tufts radiculose us. dense.

a. Leaves neither recurved nor decurrent. Monoecious (exc.

H. fastigiatum **dolomiticum*).

64. *H. hamulosum* Br. eur.

Leaves ovate-lanceolate or with broad-ovate base often denticulate at acumen; lowest basal and angular cells short not well-defined, special alar scarcely distinct; other cells linear. Perichetial leaves ovate-oblong. Capsule small nearly straight not constricted. Tufts us. yellowish green. Stem us. not pinnate; paraphyllia broad. — On earth in swamps or on rocks, »in *Amer.* also on trees and logs» (Macoun). *Eur.* in alp. regions gen. r. Norway less r.! Sweden: Lindberg. France: Husnot. *Amer. r.* Alaska: J. M. Macoun. Can.: J. Macoun; Waghorne.

65. *H. fastigiatum* Bridel.

Leaves smaller than in the last, ovate-lanceolate nearly gradually narrowed often denticulate at acumen; lowest basal and angular (alar) cells subquadrate more distinct and more numerous; other cells linear. Perichetial leaves long ovate-lanceolate. Capsule as in the last. Tufts green. Stem us. pinnate with narrow paraphyllia. — Rocks princ. calcareous in or below alp. regions. *Eur.* not r. Sweden, Norway, Switzerl.! Finl.: Brotherrus. France: Husnot. Austria: Venturi. *Amer. r.* Can.: Macoun; Waghorne.

* *H. dolomiticum* Milde.

Leaves narrower, gradually subulate. Branches less crowded; paraphyllia and rhizoids few. Dioecious. — Dolomitic and schistose rocks r. *Eur.* Switzerl.! Austria: Milde; Venturi.

66. *H. Sauteri* Bryol. eur.; Husnot m. gall.

Differs from *H. fastigiatum*: Leaves smaller and less crowded; perichetial ovate. Capsule smaller more curved faintly con-

stricted. Tufts looser. — Rocks r. *Eur.* Norway, Switzerl. Italy: Molendo.

b. Leaves recurved to the middle at both sides of basal part or at one side to acumen, subdecurent. Dioecious.

67. *H. dovrense* Kindb. mém. soc. de Cherbourg 1884.

Leaves crowded entire long-acuminate; those of stem from oval base abruptly narrowed; upper cells sublinear, lower oblong, angular round-oval, special alar hyaline larger. Capsules unknown. Tufts compact sparingly radiculose, blackish brown with green branch-tops or brown-green silver-glossy. Stem not pinnate; paraphyllia broad. — Rocks in higher alp. region r. *Eur.* Norway; W. Baur.

8. *Cupressiformia*.

A. Alar leaf-cells very small opaque often yellow or brown. Stem us. radiculose often subpinnate. Leaves often recurved below.

68. *H. cupressiforme* L.

Leaves entire or faintly denticulate us. with ovate-oblong base, often large not r. straight; alar cells somewhat numerous on a round-quadrate space, the others us. ar; costa short double or indistinct. Capsule cylindric us. large and curved; cilia somewhat long not appendiculate; lid rostellate or mamillate; pedicel us. not long. Stem brown or green often subpinnate; branches faintly compressed or r. subjulaceous. Very variable. — Earth, trees and dry rocks. *Eur.* common, r. in alp. regions. Sweden etc. *Amer.* not common. Can.: Macoun; Waghorne.

69. *H. resupinatum* Wilson.

Leaves small often serrulate above, us. nearly straight, narrower and longer-acuminate than in the last; upper cells lanceolate, alar disposed on a short-triangular space. Branch-leaves often with simple to middle reaching costa. Capsule cylindric not large often straight; cilia rudimentary; lid rostrate; pedicel short. Stem irregularly divided; branches slender. Tufts green sparingly radiculose. R. fruiting. — Trees princ. *Castanea*. *Eur.* common in Mediterr. distr. somewhat frequent near Atlantic sea in warmer distr., elsewhere r. Switzerl. Italy: Arcangeli. France: Le Jolis; Husnot. Engl.: Rogers.

B. Alar or all angular leaf-cells more distinct and pellucid. Stems eradiculose us. loosely cohering and irregularly divided. Leaves gen. entire and not recurved.

a. Special alar leaf-cells few somewhat large. Capsule cylindric.

70. *H. complexum* Miiten.

Leaves from oval-oblong base tapering to a subulate acumen, somewhat large; inner cells narrow, angular round-oval, alar quadrate; »upper cells slightly prominent at the upper end»: Lesq. et Jam.^{*)} — *Amer. r. Can. N. Brunsw.*: Moser.

b. Angular leaf-cells small. Capsules unknown.

71. *H. Vaucheri* Lesquereux.

Leaves small; upper cells lanceolate, lower basal suboblong, angular numerous not hyaline, special alar disposed on a narrow-triangular space. Stem-leaves abruptly narrowed from broad-ovate base; branch-leaves ovate-oblong or ovate-lanceolate. Tufts yellowish green. Branches julaceous or subjulaceous. — Rocks *r. Eur.* princ. in alp. regions. Norway, Switzerl.! Italy: E. Adlerz. France: Boulay. *Amer. N. Foundl.*: Waghorne.

72. *H. subcomplexum* Kindb. revue bryol. 1895.

Differs from the last: Leaves larger and shorter, abruptly narrowed from subovate base; angular cells smaller and finally hyaline without special alar. Tufts green. — *Amer. r. Can. Cypress hills*: Macoun.

9. Amblystegioidea.

73. *H. incurvatum* Schrader. — *Amblystegium* Kindb. Lanbm.; »*Amblystegium enerve* and *Hypnum Blyttii* Br. eur.»: Lindb. Leaves narrowly ovate-lanceolate long-subulate or ovate-oblong with filiform point, nearly entire or at acumen denticulate, often loosely disposed sometimes nearly straight; alar cells small green numerous quadrate on a narrow-triangular space. Perichetial leaves denticulate above with filiform point. Capsule small arcuate; lid apiculate-rostellate; cilia nodose; annulus narrow; pedicel short. Tufts bright green silky glossy or brownish, sparingly radiculose. Habit of *Amblystegium subtile*. — On rocks and walls or *r.* on trees. *Eur.* not *r.* below alp. regions. Sweden, Switzerl., Italy! *Amer. r. Can.*: Moser; Waghorne.

74. *H. depressulum* C. Mueller. — »*H. Vaucheri*»: cat. Can. m. in part.

Leaves from oval-oblong base narrowed to a subulate acumen, sinuate at base faintly denticulate above, crowded subdecurrent; angular cells round-oval not numerous, special alar quadrate hyaline larger. Capsule arcuate somewhat large; lid muticous; pedicel somewhat long. Tufts brown-green. Stem sub-pinnate. — *Amer. r. U. S.*: Lesquereux, com. Renauld. Can.: Macoun.

*) The cells are mamilllose as in *H. cupressiforme*, *Eurhynchium* etc.

Fam. 14. **Fontinalaceæ.**

63. **Fontinalis** L.

A. Leaves serrulate in upper part of acumen.

1. **Serrifoliæ.** Leaves narrow concave not conduplicate, subdistichous, us. distant.

B. Leaves entire or at apex slightly sinuate.

2. **Angustifoliæ.** Leaves narrow us. concave subdistichous.

3. **Latifoliæ.** Leaves of stem broad us. conduplicate, sometimes soon deciduous, us. tristichous.

1. **Serrifoliæ.**

A. Leaves narrowly long-acuminate not distinctly decurrent; alar cells not large. Capsule long cylindric; lid long-conic.

1. **F. disticha** Hooker et Wilson; Sulliv. ic. musc. t. 63. — *F. microdonta* Renaud ?

Leaves ovate-lanceolate not convolute; upper and inner cells narrow sublinear. — *Amer. r. Can. Macoun* *Canad. musci* n. 231 (»*F. Lescurii*«).

2. **F. filiformis** Sullivant et Lesquereux. — *F. disticha* var. tenuior Sulliv. ic. m. tab. 64.

Leaves convolute above, smaller and narrower than in the last; cells suboblong or oblong-lanceolate. — *Amer. r. U. S.: Langlois, com. Cardot.*

B. Leaves broadly acuminate often decurrent; alar cells large. Capsule oval-oblong.

a. Leaves not long-acuminate; apical cells sometimes suboval.

3. **F. Lescurii** Sulliv. ic. m. t. 61. — »*F. flaccida* Ken. et Card.»: C. M.

Leaves decurrent short-acuminate gen. ovate-oblong; cells gen. linear-lanceolate exc. the alar. Capsule with long-conic lid. — *Amer. r. U. S.: Brendel, com. C. Mueller; Fitzgerald and Langlois, com. Cardot. Can.: Macoun.*

4. **F. Sullivantii** Lindberg. — *F. Lescurii ramosior* Sull. ic. m. t. 62; *F. Langloisii* Cardot ?

Leaves not distinctly decurrent, narrowly ovate-lanceolate; cells gen. suboblong or oblong-lanceolate. Capsule with short-conic lid. — *Amer. r. U. S. Austin, com. Macoun.*

b. Leaves long-acuminate; apical cells oblong-lanceolate.

5. **F. denticulata** Kindb. in *Hedwigia* 1897 p. 61.

Leaves decurrent narrowly ovate-lanceolate, larger and longer than in the both last; cells gen. sublinear or linear-lanceolate. Capsules not seen. — *Amer. r. U. S. St Louis: Engelmann, com. Roell.*

2. *Angustifoliae*.

A. Leaves long-distant gen. concave. Us. dioecious.

a. Leaves with broad us. obtuse acumen, decurrent.

6. *F. hypnoides* R. Hartman. — F. Ravani Hy.

Leaves ovate-lanceolate; alar cells well-defined, the others lanceolate. Capsule short, oval or subcylindric; teeth red; lid short-conic. Stem flaccid. Habit of *Hypnum riparium*. — Logs and stones in stagnant or not rapidly running water r. *Eur.* Sweden!; R. Hartman; Lindberg. France: Hy, com. Le Jolis. *Amer. Can*: Macoun. U. S.: Roell, com. Cardot.

* *F. longifolia* C. Jensen; Cardot monogr. Fontinal.

»Leaves sharply acuminate split when old; middle cells sublinear. Capsules unknown. — *Eur.* r. Iceland: Feddersen»: Limpricht.

7. *F. Novæ Angliæ* Sullivant ic. m. — »F. tenella Ren. et Card.»: C. M.; F. Cardoti Renaud ?

Differs from *F. hypnoides*: Leaves smaller, slightly sinuate at apex; apical cells suboval, alar suboblong not well-defined but impressed at angles. Capsule oval-oblong; lid long-conic. — Rivers r. *Amer. Can. Brit. Col.*: Macoun.

* *F. involuta* Renaud et Cardot.

Leaves gen. involute at borders; cells sublinear exc. the more or less distinct alar. Branches more compressed. — *Amer.* r. U. S.: Langlois, com. Cardot.

b. Leaves narrowly long-acuminate acute often subulate, us. not distinctly decurrent.

8. *F. dichelymoides* Lindberg.

Leaves narrowly ovate-lanceolate; alar cells somewhat well-defined not distinctly impressed at angles, the others narrow sublinear. Capsules unknown. Habit of *Hypnum fluitans* and *Dichelyma capillaceum*. — Lakes r. *Eur. Finl.*: Brotherus. *Amer.* »U. S.»: Cardot.

* *F. microphylla* Schimper; Limpricht.

»Leaves decurrent. Capsules unknown. — Lakes r. *Eur. Germany*»: Limpricht.

B. Leaves gen. crowded. Dioecious or (*F. baltica*) paroecious.

a. Leaves short, channelled in middle.

9. *F. maritima* C. Mueller.

Leaves broadly ovate-lanceolate obtuse or short-acuminate subacute; alar cells somewhat well-defined, the others narrow sublinear. Branches rigid. Capsules unknown. — *Amer.* r. U. S. Washington in Neah-bay of Pacific sea: Eggers, com. C. M.

b. Leaves long concave; alar cells well-defined.

aa. Leaves somewhat broadly ovate-lanceolate; apical cells few suboval.

10. *F. squamosa* L.

Leaves not distinctly decurrent, subacute often with short point, more or less acuminate; middle cells lanceolate-linear, inner basal sublarceolate, alar impressed at angles. Capsule oval-oblong; teeth red; segments united; lid short-conic. Rocks in running water. — *Eur.* Germany: Schimper. Belgium: Gravet. France: Pelvet. Austria: Schmidt. Norway: Nyman.

* *F. Delamarei* Renaud et Cardot.

Capsule smaller oblong-cylindric; »teeth much shorter»: Cardot. — *Amer.* r. U. S. Miquelon: Delamare, com. Cardot.

bb. Leaves narrowly ovate-lanceolate; alar cells not impressed, the others uniform narrow.

11. *F. dalecarlica* Schimper.

Leaves decurrent gen. short-acuminate subacute; cells sublanceolate. Capsule oval-oblong; teeth orange-red; segments us. not wholly united; lid short subconvex obtuse. — Running water or lakes in northern districts. *Eur.* Sweden not r.; O. Swartz; R. Hartman. *Amer. Can.*: Macoun; Fowler.

12. *F. baltica* Klinggræff.

»Differs from the last: Leaves subulate long-acuminate. Peristomial teeth red; lid conic acute. Paroecious. — Lakes r. *Eur.* Germany»: Limpricht.

13. *F. seriata* Lindberg.

Leaves us. not distinctly decurrent, long-acuminate often subulate with a short half-twisted point; cells sublinear. Capsules unknown. — Rivers r. *Eur.* Sweden: Conr. Indebetou, detector of this species.

3. *Latifoliae*.

A. Leaves of stem distant very concave inflated decurrent, sometimes conduplicate; cell-walls sinuous.

14. *F. Heldreichii* C. Mueller.

Stem us. simple; its leaves cymbiform subcircular obtuse obtusate or short-acuminate; alar cells not well-defined, the others sublanceolate. Capsules unknown. — Rivulets in alp. region r. *Eur.* Greece: Heldreich.

B. Leaves of stem distant, plicate in middle, decurrent us. conduplicate; cells subfusiform not sinuous at walls. Us. dioecious.

a. Endostome completely cancellate. Stem without special branchlets.

15. **F. antipyretica** L. — *F. Howellii* Ren. et Card. ?

Leaves of stem ovate-oblong with gen. obtuse not long acumens; alar cells brown gen. not well-defined, the others us. sublinear-fusiform. Branch-leaves us. not much narrower. Perichetial leaves us. obtuse. Capsule oval or oval-oblong r. round-oval; teeth red; lid obtuse subconvex or short-conic. Very variable. — A var. with broader leaves and wider cells often is mistaken for *F. gigantea* Sulliv.; its leaves are often copper reddish. — Common in running water, r. in marshes and in alp. regions. *Eur.* Sweden! *Amer.* Can.: Macoun. U. S.: Delamare, com. Cardot.

* **F. gracilis** Lindberg.

Leaves more heteromorphous; the vernal of stem soon deciduous, those of branches us. as narrow as in *F. dalecarlica*. Capsule often round-oval. *Eur.* probably not r. Sweden! Finl.: Lackström, com. Brotherus. Austria: Venturi.

* **F. arvernica** Renault.

»Leaves oblong-lanceolate, sometimes with 2—5 teeth at apex. — Lakes r. *Eur.* France: Renault»: Cardot l. c.

* **F. californica** Sullivant.

Leaves often less distinctly conduplicate, gen. broad and nearly uniform; alar cells more distinct subhyaline. — Stagnant water r. *Amer.* U. S.: Bolander, com. C. Mueller and J. Cardot.

* **F. Duriei** Schimper.

Leaves as in last subspecies but slightly denticulate at apex; apical cells suboval, middle sublanceolate. *Eur.* r. France: Espagne, com. Husnot. (*Africa*: Durieu, com. Husnot.) *Amer.* »U. S.»: Cardot.

* **F. islandica** Cardot.

»Leaves narrower, sharply long-acuminate; areolation irregular. *Eur.* Iceland»: Cardot.

* **F. sparsifolia** Limpricht.

»Leaves lanceolate-linear. Peristomial teeth yellowish red. Habit of *F. antip.* »*gracilis* but more slender. — *Eur.* Norway: Bryhn»: Limpricht.

* **F. androgyna** Ruthe.

»Leaves slightly decurrent; alar cells well-defined. Paroecious. — *Eur.* Germany: Ruthe»: Limpricht.

16. **F. neomexicana** Sullivant et Lesquereux; Sull. ic. m. —

»*F. antipyretica* var.»: Cardot.

Differs from *F. antipyretica*: Leaves less distant and longer-decurrent, bright green or yellowish glossy; alar cells well-defined.

Perichetial leaves abruptly narrowed to a longish subulate acumen. — Streams r. *Amer. Can.*: Macoun. U. S.; Henderson, com. Cardot.

17. *F. gothica* Cardot et Arnell.

Leaves of stem ovate obtuse sometimes canaliculate or less conduplicate; apical cells few suboval, alar faintly brown well-defined impressed at angles. Branch-leaves narrow. Capsules unknown. — Stagnant water r. *Eur. Sweden*: O. Nordstedt.

b. Endostome cancellate only near apex. Stem with special short branchlets; their leaves small sublinear subobtuse convolute in upper half.

18. *F. biformis* Sullivant icon. muscor.

Vernal stem-leaves distant obtuse entire ovate or oblong, concave or conduplicate, soon deciduous; alar cells not well-defined, the others narrow sublinear. Estival stem-leaves crowded narrowly ovate-lanceolate subacute long-decurrent, slightly denticulate at apex and gen. short-acuminate; apical cells suboval, the others lanceolate or oblong-lanceolate exc. the alar. Capsule oblong-cylindric; lid long-conic. — Streams r. *Amer. Can.*: Macoun. U. S.: Sullivant, com. C. Mueller and J. Cardot.

c. Leaves of stem nearly crowded and not often distinctly decurrent, sometimes subconcave not conduplicate.

a. Leaves of stem very obtuse obtusate not distinctly decurrent. Stem without special branchlets.

19. *F. gigantea* Sulliv. icon. m.; Kindb. rev. bryol. 1895.

Stem-leaves round-ovate very large and broad, not often conduplicate; apical cells suboval, middle suboblong. Branch-leaves ovate-oblong short-acuminate or obtusate. Capsule broad-oval; lid obtuse. Confounded with large states of *F. antipyretica*. — Running water r. *Amer. Can.*: Macoun. *Canad. musci* n. 228.

* ***F. mollis*** C. Mueller in Bot. Centralblatt.

Stem-leaves broad-ovate very crowded not decurrent, plicate in middle but not conduplicate; upper cells suboval, middle lanceolate. Capsules unknown. — Rivers r. *Amer. U. S. Pacif.* distr.: Roell, com. C. Mueller.

b. Leaves of stem and larger branches long-acuminate subulate, often decurrent. Stem with small branchlets (as in *F. biformis*); their leaves oval-oblong very small.

20. *F. Kindbergii* Renauld et Cardot; Limpricht. — *F. chrysophylla* Cardot ?

Leaves often copper-brown and glossy; cells narrow. Stem-leaves ovate-lanceolate sometimes conduplicate; branch-leaves

concave not plicate. Capsule oblong-cylindric; lid conic; teeth red. — Ponds r. *Amer.* Can. Vanc. isl.: Macoun Canad. musci n. 233. »U. S.» Cardot. *Eur.* »France, Italy, Austria»: Cardot.

64. **Dichelyma** Myrin.

A. Leaves us. nearly straight, upper obtuse or subobtuse; costa not excurrent. Endostome not or only at apex cancellate.

1.**D.pallesceus** Br. eur. — Neckera leucoclada C. M. syn.

Upper leaves denticulate below, serrate above. Capsule oval-oblong; pedicel short-exserted. Tufts olive-green. — On wet logs or on base of trees r. *Amer.* Can.: Macoun; Moser; Fowler.

B. Leaves subulate falcate; costa excurrent or r. (in *D. cylindricarpum*) percurrent.

a. Pedicel of capsule not exserted above perichetial leaves. Endostome not or only at apex cancellate.

2.**D.capillaceum** Dickson. — Fontinalis Dicks.; Dichelyma Schimp.

Upper leaves entire; costa long-excurrent. Capsule oval-oblong, Tufts green or blackish. Leaves smaller than in *D. falcatum*. — Trees and logs by ponds or in rivulets r. *Eur.* Sweden: C. Hartman; Lindberg; Berggren. *Amer.* Can.: Macoun; Moser; Drummond n. 234.

b. Pedicel long-exserted. Endostome completely cancellate.

3.**D.falcatum** Hedwig. — Fontinalis H.; Dichelyma Myrin.

Leaves somewhat large, upper entire below and serrate above; costa short-excurrent. Capsule oblong-cylindric. Habit of *Hypnum fluitans*. — Swamps, lakes and brooks in northern districts. *Eur.* Sweden and Norway not r.! Germany very r.: Schiffner. *Amer.* r. Can.: Labrador: Waghorne.

4.**D.uncinatum** Mitten.

Leaves smaller than in the last; upper denticulate below, serrate above; costa long-excurrent. Capsule oval; pedicel shorter than in the last. Habit of *D. capillaceum*. — Logs and trees in ponds and brooks r. *Amer.* Can.: Macoun. U. S.: Howell and Henderson, com. Cardot.

5.**D.cylindricarpum** Austin.

Leaves small as in the last; upper entire at least below, sometimes faintly denticulate (not serrate) above; costa long-excurrent or percurrent. Capsule cylindric; pedicel long-exserted. Habit of the last. — Inundated rocks r. *Amer.* Can. Cascade mountains: Macoun; determ. Austin.

65. **Brachelyma** Schimper.

1.**B.subulatum** Beauvois. — Fontinalis Beauv.; Brachelyma Schimp.; Neckera C. M. syn.

»Leaves distant tristichous carinate decurrent oblong-lanceolate acute or obtuse, denticulate above; lower not falcate; cells pellucid, middle short, basal and marginal long, alar much larger; costa subpercurrent. Capsule oval; teeth orange; segments rufescent not or only at apex cancellate. Stem long pinnate; branches curved above»: C. M. and Cardot. — Logs and trees in rivulets r. Amer. »U. S.: C. M. syn.

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